THE JOURNAL OF SPEECH AND HEARING DISORDERS

STATE COLLEGE OF KANSAS
DEC 1956

Volume 21 Dec. 1956 Number 4

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The Journal of Speech and Hearing Disorders is published by the American Speech and Hearing Association in March, June, September, October and December of each year. Volumes 1-12 appeared under the title *The Journal of Speech Disorders*.

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Subscription: $5.00 per year in U.S.A.; $5.50 per year outside U.S.A.; $1.35 per single copy. Entered as second-class matter at the Post Office in Danville, Illinois, under Act of Congress of March 3, 1879. Printed by The Interstate Printers and Publishers, Inc., 19-27 North Jackson Street, Danville, Illinois.

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Rh Child: Deaf Or 'Aphasic'?*
1. Clinical Pathologic Aspects Of Kernicteric Nuclear 'Deafness'

Victor Goodhill

According to Zimmerman and Yannet (*6*), in 1875 Orth first described the occurrence of jaundice in the brain, and in 1903 Schmorl first used the term 'kernicterus' to designate jaundice of various cranial nuclear masses. The term was used first by pathologists to describe post-mortem findings. Later it was used clinically to describe sequelae of these lesions, such as extrapyramidal spasticity with athetoid choreiform movements. These were frequently accompanied by varying degrees of mental retardation and emotional instability.

A disease known as erythroblastosis fetalis was discovered early in the present century. This was also called congenital hemolytic disease. Infants with this disease showed an abnormal retention of immature erythrocytes or erythroblasts in the circulation following birth. This was a serious disease, frequently fatal. Its cause was disputed. In its most severe form, the baby was born dead. This stillborn entity was called congenital fetal hydrops. In a second form, the child was born jaundiced at birth, or became jaundiced within 24 hours of birth. This jaundice entity was called icterus gravis neonatorum. Many of these children died shortly after birth. If they survived, they frequently showed clinical evidence of kernicterus and severe anemia. In a third or mild variety of erythroblastosis fetalis, the child was born presumably normal but developed severe anemia with or without jaundice several days after birth. This entity was termed congenital hemolytic anemia. These children occasionally developed kernicteric sequelae. The etiology of this entire group of erythroblastosis fetalis remained obscure. The most common belief among pediatricians was that fetal hematogenous sepsis was the cause. Thus, the term septic jaundice of the newborn was frequently used.

This muddled situation was not clarified until 1940 when Landsteiner and Wiener (*4*) first described a new agglutinogen in human erythrocytes. They called it the Rh factor because

*The articles here published as a group are adaptations of papers delivered by the authors in a symposium at the 1955 Convention of the American Speech and Hearing Association in Los Angeles. The symposium was organized and presided over by Hayes A. Newby (Ph.D., State University of Iowa, 1947) who is Professor of Speech and Drama and Director of Audiology, Stanford University. Dr. Newby edited the papers for publication.

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a similar agglutinogen could be found in the erythrocytes of the Rhesus monkey. All persons whose red cells lack the Rh agglutinogen are spoken of as being Rh negative. All individuals whose cells possess the Rh agglutinogen are considered to be Rh positive. Rh negative individuals do not normally have anti-Rh agglutinins in their plasma. However, Rh negative individuals are likely to form antibodies if RH agglutinogen is introduced into the circulation in either of two ways. In the first place, Rh agglutinogens can be introduced in persons of both sexes when transfused with Rh positive blood. Secondly, they may cross the placenta in women pregnant with an Rh positive fetus, the fetus having inherited the Rh agglutinogen from the father.

It is accepted today that erythroblastosis fetalis is produced by the presence of Rh antibodies in the maternal blood. An Rh negative woman whose Rh positive husband is homozygous for Rh, can expect all of her children to be positive. If her husband is heterozygous for Rh, an Rh negative woman can expect half of her children to be Rh positive. Thus, during pregnancy, it is theorized that the blood of an Rh positive fetus escapes from the placenta into the maternal circulation. If the mother is Rh negative, antibodies against these cells may be produced by the mother. Such antibodies may then pass from the maternal blood into the fetal circulation and destroy Rh positive cells of the fetus by combining with them. The end result of this pathologic state is erythroblastosis fetalis.

Unless the mother has been previously transfused with Rh positive blood and has developed antibodies, or has had a previous pregnancy resulting in an abortion, a first-born child rarely will have erythroblastosis fetalis. It is rare to find sufficient concentration of antibodies during the course of a single pregnancy to harm that particular fetus. However, once the concentration of antibodies responsible for hemolytic disease in the newborn has been developed in the mother, subsequently conceived Rh positive fetuses may suffer from hemolytic disease as a result of the iso-immunization and the maternal antibodies that have persisted from the previous pregnancy.

Phelps (*5*), in 1941, described a peculiar type of hearing loss in many athetoid cerebral palsied children. In 1947, Goodhill (*2*) stated:

> Several congenitally deaf children of Rh negative mothers are now being studied. Subclinical erythroblastosis in the newborn may have etiological significance in some cases of congenital perceptive deafness. It is quite possible that changes similar to kernicterus occur in the cochlea or in the ascending auditory tracts.

In 1949, Goodhill (*3*) reported a group of cases before the American Academy of Ophthalmology and Otolaryngology under the heading of 'Nuclear Deafness.' This group included children with varying varieties and degrees of neural hypacusis and dysacusis. They all had in common a definite history of erythroblastosis fetalis due to Rh factor incompatibility. The majority were athetoid spastics with deafness, but a few had no other neurologic sequelae.

The rather peculiar bilateral symmetry of the threshold audiograms as well as the demonstration of icteric deposits in the dorsal and ventral cochlear nuclei prompted Goodhill (*3*) to suggest the term 'nuclear deafness' to describe these cases. Recent unpublished temporal bone studies by

Dorothy Wolff and Goodhill have shown an absence of end organ involvement but have demonstrated cellular destruction in the spiral cochlear ganglion, apparently secondary to the cranial cochlear nuclear damage. Thus, the Rh factor was definitely indicted as an etiologic factor in a special type of central 'deafness.'

During the past five years, the subject of Rh deafness has been intensively studied by otologists and audiologists. The group at Children's Hospital in Los Angeles has accumulated a great deal of new clinical material which is being studied and will be reported soon. These new findings contain a number of interesting observations, which can be summarized as follows:

1. It is not the Rh factor alone which can produce kernicteric and cochlear nuclear lesions. The icteric lesion can be the sequel of iso-immunization by other serologic incompatibilities. Thus, there is evidence of ABO incompatibility and a new E serologic phenomenon as causes of erythroblastosis fetalis and its neurologic sequelae.

2. It is not the icterus alone which produces the lesions described. Rather, it is the cellular anoxia produced by icteric pigment deposition that actually destroys the integrity of the neural auditory pathway. Consequently, it now appears that cerebral hypoxia and anoxia, with or without icterus, can produce lesions in this area simulating lesions of kernicterus. It is not necessary for erythroblastosis fetalis to be present for cochlear nuclear lesions to occur.

3. Since the neurologic lesions are fairly haphazard and widespread, involvements of any portion of the neural auditory pathway may occur. Thus, the auditory sequelae may represent all sorts of combinations of central lesions, with the following variety of audiometric pictures:

a. There may be the simple central 'nuclear deafness' described earlier which is a fairly fixed, stable, bilaterally symmetrical, neural hypacusis, usually moderate in degree, without recruitment, without tinnitus, and without peripheral vestibular involvement.

b. There may be a more complex type of greater degree with involvement of the central vestibular nuclei as well.

c. The neural auditory pathway may be involved in the thalamic and subcortical regions with the findings of neural dysacusis and many of the characteristics of aphasia. This group may include types which show both aphasic and nuclear components or aphasic components alone.

d. It is interesting to speculate on the possibility that the neurologic lesions may involve the reticular substance and the efferent cochlear pathway. Galambos (*1*) and others consider that this efferent pathway may have a tuning effect on the cochlea. A disturbance of this type might explain the shifting thresholds and the wide disparity between pure tone audiograms, speech thresholds, and speech discrimination scores in some of these patients.

e. The employment of the PGSR audiometric technique has shown interesting deviations in the cochlear nuclear case from the ordinary peripheral neural hypacusis case. The base line drifts

and is fluctuant, the responses to shock are erratic, and the latent period is usually prolonged. The peaks are sharper and refractory and hyperactive phases occur. These differences in themselves are quite diagnostic in some cases and may point to a nuclear or more central lesion.

In conclusion, it should be stressed that the recognition of the Rh factor and other serologic incompatibilities in the etiology of neural deafness has directed attention to the extremely important neural auditory pathway. It is impossible to think about audition logically unless the entire pathway from the auricle to the temporal lobe is considered. One can no longer talk about a simple afferent sensory pathway. A two-way circuitry has been suggested by recent studies on the efferent pathway in the reticular substance. Thus, 'nerve deafness' becomes a vast pathologic domain with many types and sub-types. When one considers the possible audiologic sequelae of diffuse diseases such as kernicterus or cerebral hypoxia, one must be prepared for the study of many otologic problems, a few now recognized but many still unknown.

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Rh Child: Deaf Or 'Aphasic'?
2. 'Aphasia' In Kernicterus

Peter Cohen

Those who work with cerebral palsied children undoubtedly have been impressed with the large number who do not speak clearly or intelligibly even after intensive speech therapy. In some of these children, the problem is due to motor involvement of the muscles associated with speech so that they cannot make themselves understood. In others, mental deficiency associated with the cerebral palsy is an adequate answer for the obvious lack of speech. The reason for the poor speech in the deaf cerebral palsied child is obvious.

However, after carefully evaluating children with speech difficulties and ruling out the complications, there are a significant number whose difficulties cannot be dismissed solely on the basis of dysarthria, mental deficiency, or hearing loss. With this in mind, a careful study has been carried out in an attempt to determine the cause of these speech difficulties.

Since 1946, when the Cerebral Palsy Diagnostic and Treatment Center at the University of California Medical Center was developed in San Francisco, we have been impressed with the preponderance of an aphasic-like language disturbance in the athetoid group which seems to be caused by kernicterus. Kernicterus as a cause of cerebral palsy is responsible for about five per cent of the cases seen in this clinic (*2*).

A total of 74 cases of kernicterus have been seen in the Cerebral Palsy Diagnostic Clinic. Of these, 20 were diagnosed as having this peculiar aphasic-like language difficulty. All of these children had psychological tests and, on the basis of these tests, were divided into the following categories: moron—three; borderline—seven; dull normal—six; normal—four. These psychological evaluations must be considered as the lowest point of intelligence level rather than the ceiling, due to the difficulties which arise in testing these children who not only are physically handicapped but who have a language handicap and verbalization problems as well. To insure the accuracy of the intelligence rating, tests have been selected which are suitable for such children.[1] Serial testing was done in some cases until the actual potential of the child was determined.

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[1]These tests included the Arthur Point Scale of Performance Tests; Ammons Picture Vocabulary Test, Form A; Ravens Progressive Matrices (1947); Columbia Mental Maturity Scale; and the 'Pointing Modification' of the Stanford-Binet, Years II to VI (not as yet standardized). The latter test is being developed by Dr. Elias Katz, Psychologist in the Cerebral Palsy Diagnostic Clinic.

Electroencephalographic tracings were obtained on 10 of these children; 60 per cent were considered to be abnormal. Hearing tests were done on all of them, including the psychogalvanic skin response determination. Of the 10 children on whom EEG data were available, four were considered to have normal hearing. Three had slight hearing defects, and in three it was not possible to determine the level of hearing ability.

Byers and his co-workers (*1*), in a study of kernicterus cases, pointed out that in five out of 17 cases, there was complete disagreement between the clinical and parental impressions of deafness and normal psychogalvanometric skin resistance responses in a number of their children. They suggest that there may be a higher level of perceptual involvement than the cochlear nuclei.

Since the term 'aphasia' implies the loss of a learned function, it may not be proper to use it in reference to children who have never spoken and, therefore, could not have lost that ability. Nevertheless, the children with such a language disability as described, although never having had pre-existing language, show so many characteristics of the aphasic adult that the term 'aphasia' conveys a picture which will be recognized by those familiar with the problems of the true aphasic. A term which might be coined for this purpose is 'aphasoid' or aphasia-like. The majority of the children in this study had symptoms suggesting the mixed receptive and expressive types of aphasia.

The clinical picture of the child suffering from kernicterus differs according to age. In the neonatal period this child is markedly jaundiced, a poor feeder, quite irritable, and quickly develops opisthotonus. The child is obviously slow in motor development; there is difficulty in head control—with either sudden head flexion or unpredictable extension—and often there is a persistence of the tonic-neck reflex. When the child finally sits by himself, body control is very poor and the arms move about aimlessly in reaching for an object. When walking is finally achieved, it is on a wide base with an incoordinated gait, arms flailing, and with continuing lack of neck and head control. There may be evidence of ataxia as well as athetosis. The eyes show an unusual complication in that there is difficulty in supraversion. Although the eyes move laterally, often there is a delay in performance of these movements. Dysarthria of varying degree is usually present. Gerrard (*3*) has reported that up to 80 per cent of the cases of kernicterus have complete or partial deafness, with particular involvement of the high frequency tones. In view of the cases studied at this clinic, one might wonder whether some of these 80 per cent who are considered deaf or hard of hearing are not actually aphasoid.

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Rh Child: Deaf Or 'Aphasic'?
3. Language And Behavior Problems Of The Rh 'Aphasic' Child

Helen Hannigan

For the child who shows aphasoid reaction with cerebral palsy, as well as questionable mental and/or hearing deficit, the problem of diagnosis and habilitation is a crucial one. Not only are there few centers where these children can receive adequate therapy and education, but much more research in modalities of therapy and education must be undertaken before it can be said with confidence what treatment is 'adequate.' One of the barriers to such research is that, too frequently, the lines of communication are poor between the diagnostic team and the therapists and teachers responsible for the training of these children. This is particularly unfortunate since, because of the nature of the child's problems, his response to training may be an important consideration in the differential diagnosis.

Subjects

This paper is based on a diagnostic study in a therapy-training situation of 20 children who presented the typical 'aphasoid' picture. Seventeen of the children were enrolled at the Northern California State Residence School for Cerebral Palsied Children for a period ranging from three to 18 months; the others were followed in the Outpatient Clinic at the Northern California Cerebral Palsy Diagnostic Center. The children were first seen at ages ranging from two to nine years. Study of this group has encompassed a period of seven years and includes follow-up studies to determine the individual progress of these children in their subsequent educational settings.

The manifestations of the language problems were primarily expressive in three children. By the age of five years, they were able to identify common objects and pictures by name in simple sentence context and to recognize the verbal symbol when the object was not immediately before them. Simple directions and statements were understood, but unusually worded directions, complex statements, and stories were poorly understood. In follow-up studies, one child (eight years) demonstrated no receptive problem; the other two had a mild receptive disturbance which was apparent in their delayed response and inattention to the spoken word when engaged in activity, and problems of abstraction.

Aphasic language manifestations in the 17 children classified as receptive-expressives ranged from what seemed to be a complete auditory agnosia to

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comprehension of a few words under certain circumstances. Immediate echolalia without comprehension was demonstrated in one case. Vocalization ranged from high-pitched squeals or grunts without words to a vocabulary of approximately 15 words and phrases used inconsistently but, in general, appropriately.

Rate of progress with training varied greatly and did not correlate directly with estimated intelligence. Factors which seemed to play a part in determining the child's progress were: the extent of specific damage (which is difficult to assess), environmental and emotional factors, consistency of training in the home as well as the more formal speech training, and the age of the child when appropriate training was started.

Neuromuscular Involvement. In each case it was necessary to differentiate those difficulties due to peripheral muscular weakness and incoordination from those which were more purely central in origin. Peripheral involvement was not regarded as a basic cause of the speech and language deficiency although, in several cases where speech had developed, some dysarthria was present. Apraxia was common in these cases. Several children showed severe hypotonicity of the total musculature which became apparent as soon as the tension necessary to do a specific activity was released. It is the impression of the author that hypotonicity rather than athetosis is the more handicapping feature in these cases; this problem merits more careful study.

Hearing. Sixteen of the children in this study received evaluations at the San Francisco Hearing and Speech Center. Evaluations are incomplete in three of these cases; one child was said to have a high frequency loss, while the remaining 12 were considered to have normal peripheral hearing.

Behavior Patterns

The Rh aphasoid children demonstrate the characteristic behavior patterns described by a number of writers, including Ewing (*2*), Myklebust (*3*), Palmer and Berko (*4*), and Strauss and Lehtinen (*5*). Their behavior is generally inconsistent; emotional lability is common; they are highly distractible, uninhibited, and given to perseveration. Spatial and sometimes temporal rigidity, resulting in compulsive behavior in the more severe cases, is a prominent and persistent pattern. Ambulatory children are usually hyperactive and, except for children with hypotonicity, are seemingly tireless.

As a group, these children are investigative but lack the integration to follow their activity to a meaningful end. Prior to training the younger child's behavior is likely to be diffuse, especially when placed in a situation with which he cannot cope. In other situations he shows what might be described as a 'practical intelligence' and reminds one of the 'neurophrenic' child described by Doll (*1*). A notable trait of these children is their self-sufficiency and independence. They are alert to situational cues and, during the early years, seem to get along very well without speech. In the majority of these cases, visual perception is good and, in spite of what often seems to be marked incoordination, the Rh aphasoid child is likely to perform well manually.

Early Speech Development

There are few data in this study on the pre-speech activity of the Rh

aphasoid child which are helpful in predicting the course of speech and language development. As more data accumulate on a larger number of cases, and in studies from birth, some pattern may be recognized which will be useful in prognostication. This study has depended largely upon the reports of parents for early speech histories.

Swallowing and chewing were generally reported as fair to good. Chief complaints were regurgitation of food during the first months, poor chewing, and/or bolting of food. In several cases, poor chewing was attributed to poor tongue function or to bad teeth.

Concerning the early vocalizations and speech attempts, parents report the following:

1. Approximately one-third of the children followed a normal pattern of vocal play and babbling, with first words spoken between the ages of two to three years. Other children were slower but followed a similar pattern. A common complaint of parents was that children would say words, sometimes over a period of months, and then cease to use them.

2. Approximately one-third of the children were comparatively silent during the first two years of life.

3. Jargon language with good intonation and inflection patterns developed in over one-half of the cases. Recordings of jargon speech show that consonant sounds were being used which could not be produced voluntarily.

4. Some children developed a poor quality of jargon that was supplemented by limited gesture language.

5. In a few cases, sounds were limited to high-pitched squeals which were emitted in times of excitement, and less frequently, grunts.

Significant Learning Patterns

Clinical observation of the child in this group during training sessions is diagnostically significant. While behavior and response when he begins to acquire speech may be partly dependent upon the methods used in training, there are certain characteristic patterns regardless of methods used.

The approach to therapy and, to some extent, the methods used largely depend upon the age of the child, and his maturation and readiness in other areas of learning. In working with the child with a receptive disturbance, the first aim is comprehension; however, it may be necessary to begin by teaching the child to listen and by encouraging communication of any kind. In the initial stages, certain name words may cause the child much difficulty and be slowly acquired. Therefore, cues are presented in the form of a characteristic onomatopoetic sound, or a gesture along with the name word ('ding dong' for bell; 'moo' for cow, *etc.*).

The following are a few observations characteristic of language-learning patterns in the initial training stages which exemplify the nature of the language handicap in the children observed:

1. Gesture and onomatopoetic cues seem to help the child 'fix' the association between the object and the spoken name word. The pattern seems to be: presentation of verbal stimulus, automatic playing out of word in gesture or sound, and recognition. Gesture and onomatopoetic cues gradually disappear as comprehension improves.

2. When children begin to speak words, they frequently have difficulty with certain sounds, but only in some words, and this may cause confusion.

For instance, a child who often pronounces 'comb' as 'home' is confused sometimes in identification of the two objects if both are in the group of pictures before him. If a tactile cue is used to help the child produce the [k] sound, the word is said plainly and the proper identification is made.

3. A common inconsistency is the recognition and naming of a picture object when confronted with it, but lack of the ability to select the picture when it is requested a few moments later.

4. It is common for children who demonstrate both receptive and expressive difficulties to coin their own names for things, by using a term which includes the use of the object or what to them is a meaningful association ('sit down' for chair; 'happy birthday' said in a sing-song voice for cake, *etc.*).

5. The aphasoid child, even as the 'normal,' does not necessarily learn the so-called 'easy' and more visible words first ('chair' and 'shoes' may be recognized and said plainly before 'dog' and 'boat'). Unusual words may be learned quickly and retained.

6. Class words often cause confusion (animal names, chair and table, knife, fork, spoon, colors, numbers, *etc.*). Older children may quickly learn to match consistently the written word with the picture, but continue to be inconsistent in recognition and use of the spoken word. Two of the children in this study showed good number concepts and were doing simple addition and subtraction before they could recognize the spoken symbol and were able to count to ten.

7. The aphasoid child may quickly 'pick up' the appropriate use of words presented in a play situation or while engaged in an activity of interest. One of the first words of a five year old was 'turns.' She used this word to indicate her desire to play the game in which she had first heard the word. A seven year old boy, working in Occupational Therapy, described his own activity by saying, 'Put it in the vise,' a direction used inadvertently by his occupational therapist. However, he later showed confusion when the speech therapist asked him, 'Where is the vise?'

8. Those aphasoid children who have had some training as deaf children will seem to be dependent upon lipreading. However, when carefully tested, it is found that comprehension after training is equally good, with or without visual clues. It would appear that too much attention to lipreading in the early stages of training interferes with comprehension.

9. A too direct attention to the placement of the articulators and the eliciting of more nearly perfect sounds seem to result in syllable confusion, as well as poor voice quality and loss of pleasing inflection. Under such pressure, the voices of these children will become constricted, guttural, and monotonous, although their jargon or spontaneous speech will show pleasing quality and inflection.

10. As other writers have noted (*3, 6*), the aphasoid child responds to familiar voices, even though he cannot respond to an unfamiliar voice.

11. Delayed response, even after a child shows considerable progress in language acquisition, is common in these children.

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Rh Child: Deaf Or 'Aphasic'?
4. Variations In The Auditory Disorders Of The Rh Child

Jack Rosen

Since 1940, when the Rh factor in blood types was discovered, extensive investigation has amassed a wealth of information about the phenomenon. Among the sequelae of Rh incompatibilities, a clinical entity known as 'Rh deafness' has gained wide acceptance during the past five years. Such deafness is attributed to a lesion resulting from icteric deposits in the cochlear nuclei.

The limited literature on the deafness said to be associated with Rh incompatibility, erythroblastosis, and kernicterus discloses a number of contradictory and questionable statements or conclusions. Even the incidence of such deafness is grossly different from one report to the next. More than a sampling difference is suggested by the range of only four per cent of the kernicteric children found to have deafness by one author (*2*) to as high as 80 per cent (*3*) or even greater (*4*).

The 'typical' audiogram reported for these cases by Crabtree and Gerrard (*3*) shows the characteristic high frequency loss of nerve type deafness. The hearing loss is also described as bilaterally symmetric by Goodhill (*5*). Gerrard (*4*) presents evidence of bilateral cell destruction in the cochlear nuclei, the hypothetical locus of the damage to the auditory pathway. While Gerrard expects that the damage may be extensive enough to cause total deafness, Goodhill finds that total deafness does not occur in cases of athetosis, possibly because of the diversity of the auditory pathways. Cavanagh (*2*) reports that her cases did not show bilaterally symmetrical deafness in the high frequencies; Goodhill's audiograms are, in fact, more often relatively flat curves than any other type.

Only passing mention has been made of the difficulty of obtaining consistent test results in these children. Yet, the 'fluctuating hearing' of these children is well known to all who have had the opportunity to test or train them. Cavanagh's cases were tested by Professor Alex Ewing, who found several untestable and many other cases in which he could make only gross estimates. In one case, Ewing felt that deafness might be only slight, even though the child's responses were never to tones lower in intensity than 50-60 db.

Byers, Paine, and Crothers (*1*) report that psychogalvanometric testing seemed to disclose normal hearing in six of their young patients, but that testing by conventional methods does not support these results. They are inclined to accept results obtained by conventional methods because they

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believe that the benefit seemingly offered their patients by hearing aids demonstrates the existence of a true sensory deficit.

The present paper is based upon the hypothesis that many of the cases of deafness reported in children born of Rh incompatibility are not 'deafness' in the ordinary sense (*i.e.*, elevation of auditory thresholds). Such children frequently manifest a central disorder of perceptual integration, symbolization, or motor coordination which may prohibit reliable testing by standard audiometry.

Among the children seen at the San Francisco Hearing and Speech Center, all cases with positive, clear-cut diagnoses of erythroblastosis fetalis and kernicterus originating in Rh incompatibility were collected. Thirty-three such cases remained after as many more had been discarded for lack of sufficient confirmation of the diagnoses in the medical histories. This highly selected sample represented further restriction in the fact that those cases referred to the Center had already been diagnosed as deaf, or had at least strongly suggested deafness to examiners.

The 33 were almost equally divided as to sex, 16 male and 17 female. The mean age of the children at the time of testing was seven years, with a range from six months to 14 years. All but one of the children included in the study demonstrated marked athetoid symptoms, with ataxia also present in a considerable number. The one exception was considered to have more spastic involvement than athetoid movement.

Test Methods

A wide variety of techniques was employed in evaluating the difficult diagnostic problems these children represented. Standard pure tone and speech audiometry were administered whenever possible, but it was rarely possible to test these children successfully by standard methods alone. Virtually all the many variations of play audiometry with both pure tones and speech were applied as they seemed feasible. Also utilized were noisemakers, musical and sound effects recordings, white noise, and other acoustic stimuli.

Psychogalvanic skin response audiometry was necessary in testing most cerebral palsied children, as it has been in testing other children unable to cooperate in standard audiometric procedures. PGSR, when used as part of a test battery rather than as a separate routine, has provided a dual-purpose tool to clinical audiometry. Besides its primary purpose of indicating whether a sound is heard, its conditioning procedure often aids in eliciting voluntary responses or gross reflexes to auditory stimulation.

The sound-proofed room in which most tests were given contained earphones, loudspeaker, and electrodes, but was otherwise fitted as a playroom. The adjacent control room, separated from the test booth by a one-way mirror, contained all other equipment.

Testing of young children was performed by a team of two clinicians. One worked directly with the child to control and direct him in play activities which would contribute to the total evaluation, while the other administered the hearing test from the control room. Both collaborated closely in most aspects of the testing, observation, and evaluation of the child.

Tests of this type, especially for the

pre-school age group, usually required two visits of one and one-half hours each. These were scheduled on consecutive days whenever possible; additional visits were arranged, if necessary. Thus, six man-hours, and sometimes more, were required for many of the tests.

Flexibility of test procedures is a primary consideration in testing the hearing of young children; it was especially so in testing the subjects of this study. The activity and apparent condition of the child at each moment of the test had to determine the procedure. Voluntary play audiometry was attempted whenever the opportunity presented itself. Pure tone testing by PGSR was interspersed with speech, music, and other stimuli. Conditioning and testing were intermingled. New tones were often introduced before consistent thresholds were established for tones previously presented. Duration and frequency of presentation of the tones were altered to suit the momentary situation, and tones or speech were switched from one ear to the other as the tester saw fit. Standardization of test procedures was rejected as not applicable to the testing of these children.

Test Results

All who demonstrated hearing at 10 db or better throughout the audiometric range of 250 or 500 to 4000 cps were classified as 'normal hearing.' Of the 33, all previously diagnosed as deaf or hard of hearing, 11 were found to have normal hearing. The best previously reported level for any child in this group had been 40 db; the poorest, 99 db. Three had been in schools for the deaf; two are still in such schools. In almost every case, the results obtained by PGSR were verified by voluntary responses or other reflexes during the course of testing, or have since been verified by the obvious responses of the child to teacher or parent.

Seven children responded at levels of 15 to 20 db throughout the range of frequencies mentioned above. In several of these cases, lower thresholds were established for 4000 and 8000 cps than for the lower frequencies, but this may have been an artifact created by the special attention given to the high frequencies in cases where high-frequency deafness might have been expected. From observation of these children, the conclusion was reached that there was probably normal hearing but that the tests simply had not thus far been able to establish this.

Various levels of auditory sensitivity, from 25 to 60 db, were established for 12 of the children. These levels do not necessarily represent the extent of hearing loss. All that may be stated with confidence is that any hearing loss which may exist is not greater than the specific level thus far established for each patient. What the potential auditory sensitivity is in each of these children will not be known until continued testing can determine a stable, consistent set of test results. In at least nine of the children with levels of auditory sensitivity from 25 to 60 db there is considerable evidence indicating little or no defect of hearing.

The three remaining cases are the only children in the entire series in which the audiometric results and the observations suggest the existence of an actual hearing loss. Even among these, there is at least one case in which school audiometrists have reported near-normal thresholds in a

relatively flat audiogram. However, test results obtained by the writer indicate the presence of a marked high-frequency deafness, with fairly low thresholds for the lower frequencies, in each of the three. In one of these there were decidedly different thresholds for the two ears, but with the same general slope of the audiogram. An interesting sidelight is the fact that one of these children responded to high-frequency tones in a manner which strongly suggested the presence of recruitment. What this might imply concerning the site of the lesion is provocative.

Discussion

A detailed discussion of the rationale of children's hearing tests is beyond the scope of this paper. However, a digression to the relationship between such tests and routine audiometry is necessary. Standard audiometry consists of a series of tests, at some particular frequency, which establishes a level of intensity representing the best hearing which the patient can demonstrate at that frequency. It is occasionally necessary to review the assumptions upon which such tests are based.

Each step of a hearing test is a test of the hypothesis that the patient can hear the tone at the particular intensity. If he responds consistently in a recognizable manner, it can be stated with confidence that he hears that tone at that intensity. If he does not respond, the hypothesis can neither be accepted nor rejected. We simply do not know whether he hears the tone or not, except by inference from other information which may be available. The hypothesis that he can *not* hear is inappropriate because only the responses are measured by audiometry.

The assumption is made that the ability to hear a tone at one intensity establishes the ability to hear tones of the same frequency at all greater intensities. Failure to respond to the tone at the higher intensity level is usually interpreted to mean that the patient is not paying attention.

An Rh child is extremely distractible and hyperactive—pathologically so, in fact. If he responds to a sound at one moment, but does not respond the next moment to the same sound at a higher intensity, the assumptions of audiometry do not justify the conclusion that he does not hear the higher intensity. If, besides, consideration is given to the possibility that the speech or other sounds may have no meaning to the child, the confusions resulting from tests performed in a routine, standardized manner may be explainable.

Aside from the athetoid movements, hyperactivity, distractibility, and perseverative tendencies generally noted in the Rh children, one may frequently observe a long latency period between stimulus and response in either PGSR or voluntary testing. Such a latency may contribute further to the confusion caused by the child's apparent failure to respond to sounds. It should be noted that the duration of the latency is also inconsistent.

The 'fluctuations' so frequently noted in the Rh child's apparent ability to hear are not confined to hearing alone. Visual and tactile stimuli often elicit inconsistent responses. Even the responses to the electrical stimulation utilized as the unconditioned stimulus in PGSR tests are as erratic as are their responses to sounds. There seems to be a fluctuation of the general perceptual integration of the whole child rather than fluctuations in particular sensory modalities.

The language difficulties vary a great deal, but the kinds of jargon many of the children use, their voice qualities, and the difficulties they have with word meanings suggest a basis other than deafness for the linguistic handicap. By extrapolation from the observed characteristics of the brain-injured adult, the problem of the Rh child may often be interpreted as a type of receptive and/or expressive aphasia. The fluctuating response to sounds may even be indicative of an auditory agnosia in some cases.

Auditory disorders in these children take a variety of forms. A few may suffer hearing losses with definite thresholds, similar to the hearing losses of other hard-of-hearing children. Whether the lesion in such cases is peripheral or central has not yet been established. Perhaps clarification may be achieved when several with definitely established hearing losses come to autopsy. The great majority of children in this series seem to demonstrate sufficient cortical involvement, at least functionally, to prevent normal responsiveness to sounds and other stimuli. It is not easy to establish in each case whether the pathology may be classified as an aphasia or an agnosia, or whether the failure to respond is simply due to the child's gross mental and physical handicaps. Cases which could readily fit all these categories have been seen.

Hearing aids and auditory training units are often recommended for such children because of the supposed deafness. Amplification seems to help for a time in some of the cases, perhaps because the instrument or the amplified sound helps direct the child's attention. Usually the child soon rejects the amplification, but in a few cases the continued use of a hearing aid may have conditioned the child to respond only to loud sounds.

School placement is a most complex problem. Many have been placed in classes for the deaf where, in the writer's experience, few such children have responded well. Where learning has taken place, it seems to include most prominently the unfortunate by-products of the training for the deaf and permits little of the spontaneous learning these children frequently demonstrate when in a good speech environment. Special training programs for brain-injured and aphasic children are needed to accommodate the numbers of children now being recognized as neither deaf nor mentally retarded.

To hasten the advent of such programs there is also a need for more adequate diagnostic methods and facilities. Although considerable progress has been made, there is not yet any one method which can offer precise test results for the hearing evaluation of these children. In the meantime, the methods which have been developed should be made more widely available.

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Rh Child: Deaf Or 'Aphasic'?
5. Some Psychological Considerations Of The Rh Child

Helmer R. Myklebust

The Rh child presents a stimulating and provocative problem. The topic of this symposium, although stated narrowly and specifically, implies the difficulty this youngster presents to the diagnostician and therapist. It implies further that this child has a receptive incapacity; he either cannot hear or he cannot understand what he hears. This either-or statement of the problem assists us in thinking definitively. However, the problem can be stated differently. One might ask, 'Is the Rh child's problem due to peripheral or central nervous system damage?' Also, one cannot avoid the question of whether it might be due to a combination, that is, a mixture of peripheral and central damage, a mixture of deafness and aphasia. The answer or answers to these questions probably cannot be secured through study of only one aspect of any child's behavior. For example, a hearing test alone irrespective of the nature of the test would not be expected to provide all of the necessary information on which to base a good judgment. Auditory appraisal would provide part of the information desired.

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Originally it was thought that the damage occurred mainly after birth. It was presumed that if the blood could be changed without anoxia or undue jaundice occurring, then the child should suffer no ill effects. It is now the opinion of some specialists that the basic damage to the organism occurs prenatally. According to their view, the development of antibodies may result in a true, perhaps generalized hypoplasia, at least in some of these children. This means that total development may be interferred with if not interrupted.

The purpose of reviewing the nature of the condition is to gain some perspective relative to whether one might expect primarily central damage (brain) and thus aphasia, or peripheral damage and thus deafness. If it is true that the basic damage to the organism occurs prenatally, then it is logical to assume that these children present a language problem because of damage to the central nervous system. If deafness is present, it is essentially a secondary and complicating factor rather than being basic to the generalized involvements commonly found in these children.

Perhaps comparison of the Rh child with aphasic children and with children having deafness would be helpful. One might ask the question, 'Are

Rh children more like aphasic children or more like children with deafness?'

It has been the author's experience that Rh children are more like brain-injured children than like those with simple deafness. The Rh child, if studied appropriately, frequently gives evidence of having an inability to *listen* rather than an inability to *hear*. His auditory disorder includes inability to integrate, structure, and perceive. He has sensation but lacks meaningfulness and purpose in relation to it. He frequently does not respond to hearing tests and may be thought to be severely deaf and often is so diagnosed. However, at six years of age or older many of these children begin to show evidences of hearing which is entirely adequate for purposes of hearing speech. This, of course, is in contrast to children with genuine deafness. From the point of view of hearing, it has been necessary to conclude that although high frequency deafness might be found in a number of these children, their auditory problem in early life cannot be explained on this basis alone. A more generalized auditory disorder including aphasia, auditory agnosia, and disturbances of auditory perception are more common if not the rule.

Another comparison that might be made is in terms of genetic development. Children with uncomplicated peripheral deafness are not retarded as compared to the average hearing child in age of sitting alone, age of walking, or in age of toilet training. This is in contrast to the child with congenital aphasia; he is retarded in maturation of such functions but significantly less so than the mentally deficient child. Although generalization always is difficult especially because much more research is needed, it seems that the Rh child is substantially more like the brain-injured child with aphasia. Therefore, even if hearing loss is present, to consider him as only hearing impaired would be over-simplification in many instances.

Whenever such a difficult problem as the ascertainment of whether deafness versus aphasia is present in a young child arises, it is necessary to view or study the child in various ways. An area which provides highly useful information in this respect is that of motor ability. As indicated by the normal maturational ages of sitting and walking, children with deafness usually perform well on tests of motor coordination, with the exception, of course, of those who have vestibular defects. Aphasic children, on the other hand, almost universally show generalized motor coordination deficiencies on such tests. In this regard, too, the Rh child is most like the brain-injured aphasic youngster.

It is well established that if the Rh child has cerebral palsy, it is commonly of the athetoid type. This highlights not only the necessity to study the Rh child motorically but it reveals that a number of these children have a motor disorder which results from *central*, not peripheral nerve damage. However, many Rh children do not have a motor disorder which is as apparent as athetosis. Their motor problem might not be obvious or apparent without careful study with motor tests. When this is done, the results frequently point to brain injury. This makes it necessary to view the child educationally from the point of view of the psychology of brain injury whether or not a superimposed loss of hearing is present.

Rh children have other characteristics which are associated with brain

injury. For example, on appraisal of intellectual functioning, they show perceptual disturbances, uneven maturation of functions such as memory, conceptualization, and integrative ability. Disturbances of the development of psychological processes might be so general that true mental deficiency is present.

Another measure which manifests differences between aphasic and hearing impaired children is the Vineland Social Maturity Scale. On the average, aphasic children below six years of age have a social quotient of 75, whereas children of the same age with deafness have an average quotient of 90. The aphasic child has a generalized inability in social maturation but the hearing impaired child is retarded essentially in the area of communication on this scale. In the author's experience, the Rh child is comparable to the aphasic child in social maturity. Generally, he has difficulty in general social maturation including self-help, locomotion, socialization, communication, *etc.*

In summary, it is the author's experience that the Rh child should be viewed primarily from the point of view of the psychology of brain injury rather than from the point of view of the psychology of deafness; that the basic problem is brain injury, and that either aphasia or deafness, or both may be present. Also, that other conditions such as dyslexia, dysgraphia, agnosia, and apraxia also should be considered, inasmuch as all of these conditions occur in brain-injured children and affect auditory behavior and language development.

Correlation Between Two Measures Of The Severity Of Stuttering

Dorothy Sherman

William D. Trotter

In a real-life speaking situation, a listener's evaluation of the over-all severity of the audible characteristics of stuttering is probably based mainly upon the two factors of frequency and severity of the individual moments of stuttering. At least it is difficult to postulate what other factors would enter importantly into an over-all severity judgment. A frequency count of individual moments of stuttering has often been used as the sole measure to quantify the severity of stuttering.

The question arises as to whether frequency count measures are, in general, closely related to severity measures based upon listeners' reactions to individual moments of stuttering. Data from a recent experiment by Trotter (*3*, *4*) are suitable for an evaluation of this question.

Severity measures were obtained for each word stuttered by each of 20 stutterers during five successive readings of the same 500-word passage. These severity measures were the means of ratings by a group of 11 observers, all of whom had had training in stuttering therapy. They judged the severity of each individual moment of stuttering on a nine-point equal-appearing intervals scale extending from *one*, for least severe stuttering, to *nine*, for most severe stuttering. Also obtained were frequency counts of words stuttered by each stutterer during each reading. With these data available it was possible to measure the correlation between the frequency of stuttering during the reading of a passage and the mean severity of individual moments of stuttering during the same reading.

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Results

From the data for five successive readings five Pearson *r*'s were computed to estimate the strength of the relationship between frequency and severity of individual moments of stuttering. The obtained *r*'s were .57, .64, .68, .58 and .60 for the first through the fifth readings, respectively. To test for significant differences among the five *r*'s a readings-by-subjects analysis of variance was employed. The criterion measure for this analysis, computed for each stutterer for each reading, was as follows: $xy/\sigma_x \sigma_y$, where x equals the deviation from the mean of the frequency measures for a particular reading and y equals the deviation from the mean of the severity of

TABLE 1. Summary of analysis of variance, testing differences among readings with respect to relationship between frequency and rated severity of moments of stuttering.

Source of Variation	*df*	*ss*	*ms*	*F**	$F_{.05}$
Readings (R)	4	.17	.04	.13	2.50
Subjects (S)	19	123.58	6.50		
RS	76	22.47	.30		
Total	99	146.22			

$^*F = ms_R/ms_{RS}$

the moment measures for the same reading. According to the definition of the Pearson r[1], the mean of these criterion measures for any one reading is the correlation coefficient measuring the strength of the relationship between the frequency of occurrence of stuttering during that reading and the mean severity of stuttering on the words stuttered during the same reading.

Results of the analysis (see Table 1) permit the assumption that the relationship between frequency measures and rated severity measures is constant for five successive readings of the same passage. An estimate of the correlation between the two measures is thus the mean[2] of the obtained r's, .61, which is significantly different from zero beyond the one per cent level. The limits of the 95 per cent confidence interval, as determined by the z transformation, are .24 and .83.

An examination of the measures employed in the analysis for evaluating differences among obtained r's indicated considerable variation from stutterer to stutterer with respect to the relationship between frequency and rated severity measures. In order to estimate the consistency of the relationship between the two measures for individuals from reading to reading, an intraclass r was calculated (*1*). The intraclass r is often employed in estimating the reliability of sets of ratings, test scores, and similar measures when there are several trials available for the same individuals. In this instance the obtained coefficient may be interpreted as a measure of the consistency of individual stutterers from reading to reading with respect to their contributions to the Pearson r's obtained as estimates of the relationship between the frequency and the rated severity measures. A fairly high intraclass correlation coefficient of .81[3], with a relatively narrow 95 per cent confidence interval (limits of .60 and .89[4]) indicates that the relationship

[1] $r = \Sigma xy/N\sigma_x\sigma_y$

[2] Employing the mean as the average value of the five r's provides a reasonable estimate of the population value because the n's are the same and the various values of r do not differ greatly (*2*, p. 134).

[3] $r = ms_i + ms_{wi}/ms_i - (k-1)\,(ms_{wi})$ = 6.50 + .28/6.40 — (4) (.28), where ms_i = mean square between individuals, ms_{wi} = mean square within individuals, and k = number of readings.

[4] Confidence interval limits were determined by the method described by Ebel (*1*).

between the two measures tends to remain the same from reading to reading for individual stutterers.

Discussion

In this experiment the conditions which produced a reduction in frequency of stuttering also produced a reduction in the mean severity of individual moments of stuttering. The hypothesis that a situation or state of affairs which reduces the frequency of stuttering will concomitantly reduce the mean severity of the stuttering responses thus seems reasonable. Conversely, it may be hypothesized that a situation which reduces the mean severity of stuttering responses will also reduce the frequency of stuttering. These hypotheses, if valid, have significant therapeutic implications to the degree that factors contributing either to frequency or to severity of individual moments of stuttering are amenable to modification by means of clinical procedures.

The obtained correlations between the two measures were not significantly different from reading to reading, with an r of .61 as the over-all estimate of relationship. The obtained intraclass r of .81 indicated that the relationship between the two measures tends to remain constant over the course of the five readings for individual stutterers. Significant decrements over the course of the five successive readings for both the frequency measure means and the rated severity measure means have been previously reported (*3, 4*). These findings provide evidence to support two hypotheses: (1) frequency of stuttering tends to vary directly with average severity of individual moments of stuttering; and (2) a decrease in frequency of stuttering by the individual is, in general, accompanied by an average decrease of severity of individual moments of stuttering. The obtained correlation coefficients, however, do not indicate a one-to-one relationship between the two measures. Furthermore, the relationship between the two measures for individuals, although fairly consistent from one reading to another for the same individual, varies from one individual to another. A satisfactorily accurate estimate of neither frequency nor average severity of individual moments of stuttering could be obtained by measuring the other. Both frequency and average severity of individual moments of stuttering should thus apparently be taken into account for any complete evaluation of the severity of audible characteristics of stuttering.

The extent to which the two factors contribute to the judgment of over-all severity might be examined by means of the multiple correlation procedure. An over-all severity rating of the stutterer's performance in reading a passage, obtained by means of a psychological scaling technique, could be used as the criterion or dependent variable with frequency and mean severity of individual moments of stuttering as the independent variables. It seems likely that such characteristics as rate of speech, circumlocutions, or substitutions of words employed in the attempt to avoid stuttering would have little if any effect upon the listener's judgment of over-all severity. Whether the addition of other independent variables would increase the value of the multiple correlation coefficient, however, is a question which could be subjected to experimental test.

Further experimentation might also

be concerned with the identification and comparative evaluation of the factors which enter importantly into a judgment of severity of an individual moment of stuttering. Here, also, the multiple correlation procedure, employing rated severity of the individual moment of stuttering as the criterion or dependent variable and such factors as duration and rated complexity of stuttering pattern as the independent variables, could be useful.

Summary

The purpose of this study was to evaluate the relationship between the frequency and the mean rated severity of individual moments of stuttering. Data for five successive readings of a 500-word passage by each of 20 stutterers were analyzed. On the basis of the obtained results the following statements may be made:

1. Frequency and mean rated severity of individual moments of stuttering are significantly and positively correlated.

2. The strength of the relationship between the two measures does not vary significantly over the course of five successive readings of the same passage.

3. The relationship between the two measures is not strong enough that one measure would be useful for predicting the other.

4. A complete evaluation of the over-all severity of the audible characteristics of stuttering should probably take into account both frequency and severity of individual moments of stuttering.

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MMPI Profiles Of Stutterers' Parents: A Follow-up Study

Leonard D. Goodstein

As part of an earlier large-scale empirical investigation of factors involved in the onset of stuttering (*3*), Minnesota Multiphasic Personality Inventory (MMPI) profiles were collected. The inventories were obtained from both parents of 100 stutterers, the experimental group, and 100 nonstutterers, the control group. The MMPI was used to compare the relative psychological adjustment and personality characteristics of the two groups of parents. It was selected because it had been developed by empirically demonstrating significant differences in test responses between normal persons and a variety of types of psychiatric patients (*6*). Not only has the MMPI been shown useful in clinical settings but it has also been successfully used in the description and understanding of normal persons.

In this earlier investigation, a family was considered in the stuttering or experimental group if one or both of the parents regarded the child as a stutterer and if the duration of the stuttering was reported as less than 36 months. Each experimental family was matched to a control family, in which the parents had never regarded the child as a stutterer. Matching was made on the basis of the child's age and sex as well as the socio-economic status of the parents. The results of the MMPI phase of this investigation (*1*) revealed that there were no significant differences between the control and experimental parents on any of the nine clinical scales; the control parents had a significantly higher score on the *K* scale, one of the three validity scales, suggesting greater defensiveness on their part; while the experimental parents were significantly higher on the Taylor Manifest Anxiety Scale (A-scale) (*4*), a special anxiety scale which may also be scored on the MMPI. The scores of both groups of parents were virtually identical to those expected from normal adults, and it was concluded that there was no evidence that the etiology of stuttering is rooted in gross psychopathology of the stutterer's parents.

While these results are both clear-cut and consistent with the results of the overall investigation, their application to the typical speech clinic setting requires caution. These stutterers, by the very nature of the selection criteria, were rather young, the mean age being 5 years, 0 months; it might be assumed that their parents may not be like those of the older, more severe stutterers usually seen in clinics. The purpose of the present

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TABLE 1. Means and S.D.s of the MMPI scales for three groups of parents and the significance levels of the differences between the means.

	Follow-up Parents (N=100)		*Experimental* Parents (N=200)*		*Control* Parents (N=200)*		*Significance Levels*		
Scale †	*Mean*	*S.D.*	*Mean*	*S.D.*	*Mean*	*S.D.*	*Follow-up v. Experimental*	*Follow-up v. Control*	*Experimental v. Control*
L	3.8	1.7	3.3	1.9	3.6	1.8	n.s.	n.s.	n.s.
F	2.9	2.8	3.2	2.5	2.8	1.8	n.s.	n.s.	n.s.
K	15.6	4.1	15.5	5.2	16.9	4.8	n.s.	n.s.	.05
Hs	52.9	9.5	51.6	8.7	53.0	7.4	n.s	n.s.	n.s.
D	54.0	8.4	53.9	10.3	52.4	9.2	n.s.	n.s.	n.s.
Hy	56.3	9.0	55.5	7.9	56.1	7.7	n.s.	n.s.	n.s.
Pd	51.2	8.2	53.2	9.6	54.8	9.0	n.s.	.01	n.s.
Mf‡	52.8	8.5	52.5	10.1	52.7	7.7	n.s.	n.s.	n.s.
Pa	53.1	8.1	52.8	7.8	52.3	9.0	n.s.	n.s.	n.s.
Pt	51.7	8.7	53.0	8.6	51.9	10.1	n.s.	n.s.	n.s.
Sc	50.1	9.8	51.7	9.0	52.2	6.8	n.s.	n.s.	n.s.
Ma	48.0	8.9	51.9	10.1	51.2	7.7	.01	.01	n.s.
A	13.2	7.6	14.3	7.6	11.8	7.8	n.s.	n.s.	.01

* These data are taken from Goodstein and Dahlstrom (1).

† The scores on the clinical scales (*Hs, D, Hy, Pd, Mf, Pa, Pt, Sc,* and *Ma*) are in *T*-score units; all the others are expressed in raw score units. *K* scale corrections are included where appropriate.

‡ The three groups of fathers were significantly higher ($p < .01$) than the three groups of mothers; the scores were combined, however, for simplicity in presentation.

investigation was to attempt to cross-validate the earlier MMPI findings with a sample of stuttering cases typical of those seen in speech clinics.

Subjects and Procedure

Fifty consecutive stuttering cases seen in the Outpatient Clinic of the State University of Iowa Speech Clinic constituted the sample of typical stuttering cases used in this investigation. These cases, who had been seen over a five year period, were selected from the Clinic files on the basis of the following criteria: the final clinic diagnosis of the child was that of stuttering, the child did not present any additional marked speech or physical handicaps, the MMPI profiles of both parents were available, and the validity scale scores of both MMPI profiles[1] were not suggestive of dissimulation. The cutting scores for exclusion on the basis of suspected dissimulation were: *L* scale raw score of 7 or higher, or *F* scale raw score of 17 or higher, or *K* scale raw score of 28 or greater; these were the same cutting scores that were used in the initial study.

The mean age of these children was 10 years and 10 months and the mean duration of the stuttering problem, according to the parents' reports, was seven years and one month. The mean

[1] It is beyond the scope of this report to discuss the administration, scoring and interpretation of the MMPI. Readers unfamiliar with the instrument will find the recent volume by Welsh and Dahlstrom (6) a valuable source book of information.

rating of the severity of stuttering, obtained by means of the Iowa Scale for Rating the Severity of Stuttering (*2*) was 3.46, indicating a mild to average degree of stuttering. A subjective evaluation of the case data was that these cases represented a typical cross-section of stutterers seen at the Iowa Speech Clinic.

One additional technique for evaluating and comparing MMPI profiles is through the use of high-point codes (*5*). In such a procedure, the MMPI clinical scale having the highest *T*-score would be placed first in the code and the remainder of the clinical scales are ranked in descending order according to the obtained *T*-scores. The pattern is indicated without regard to the level of the score elevation. The absolute elevation of the profile is indicated by then inserting symbols in the code indicating those scores above 90, those between 80 and 89, *etc*. Each MMPI profile in this study was coded in such a high-point code.

Results

The means and standard deviations on the 13 MMPI scales used in this study are presented in Table 1. These are for the 100 follow-up parents (50 mothers and 50 fathers) and the original 200 experimental and 200 control parents, together with the significance levels of the mean differences between the three groups. A prior comparison of the means of the fathers with the means of the mothers gave no evidence of any sex differences in the scores, and so the data for the two sexes were combined. The only exception to this finding was for the Masculinity-femininity (*Mf*) scale on which the fathers had a significantly higher ($p < .01$) mean *T*-score than the mothers; for consistency in presentation, however, these distributions were also combined. Similar results were obtained and identical procedures had been followed in the initial study.

There was only one significant mean difference between the follow-up and experimental group and only two significant mean differences between the follow-up and control groups. The differences between the original experimental and control groups have been reported previously (*1*) and are included here only for completeness. The follow-up parents had a significantly lower mean score

TABLE 2. Relative frequencies of the initial scale in the high-point code for the three groups of subjects.

	MMPI Clinical Scales									
Group	*Hs*	*D*	*Hy*	*Pd*	*Mf*	*Pa*	*Pt*	*Sc*	*Ma*	*Total*
Follow-up Mothers	5	11	15	4	3	2	1	3	6	50
Experimental Mothers*	4	13	18	12	15	12	8	6	12	100
Control Mothers*	3	18	27	22	6	7	7	5	5	100
Follow-up Fathers	2	10	11	3	10	3	4	3	4	50
Experimental Fathers*	5	17	16	8	23	4	5	4	18	100
Control Fathers*	1	10	17	18	27	4	5	3	15	100

*These data are taken from Goodstein and Dahlstrom (*1*).

on the Mania (*Ma*) scale than either the experimental or control parents ($p < .01$), and were significantly lower than the control parents on the Psychopathic Deviate (*Pd*) scale.[2] None of the other mean differences involving the follow-up parents were significant at an acceptable level of confidence.

The relative frequencies of the initial scale in the high-point code, that is, the clinical scale with the highest *T*-score value are presented in Table 2 for the six groups of subjects, the mothers and fathers in the follow-up experimental and control groups. The obtained frequencies for the follow-up mother groups were compared with the frequencies for the other two mother groups by means of chi-square tests for two-by-nine tables; similarly the frequencies for the follow-up father group were compared with the other two father groups. None of the obtained chi-squares were significant at an acceptable level of confidence indicating the obtained frequencies for the two follow-up groups were not different from the frequencies of the original groups. No differences had been found between the experimental and control parents in the original study. As in the original study, there was a highly significant ($p < .01$) difference between the males and the females but there was no evidence to suggest that these differences are related to the stuttering problem.

The families in the follow-up group were then divided into two subgroups: the 'disturbed' sub-group where one or both parents had one or more *T*-scores above 70 on one or more of the clinical scales (the usual cutting score indicating 'abnormal' responses), and the non-disturbed subgroup where neither parent had a *T*-score above 70 on a clinical scale. There were 18 families in the disturbed sub-group and 32 families in the non-disturbed group; in the initial study, 41 of the 100 families in the experimental group and 42 of the 100 families in the control group were classified as disturbed by this criterion.

As in the initial study, the mean rating of the severity of stuttering on the Iowa Scale for Rating the Severity of Stuttering (*2*) was calculated for the two sub-groups. The mean severity rating for the children whose parents were in the disturbed group was 3.40, while the mean rating for the non-disturbed group was 3.55; the mean difference does not even approach an acceptable level of significance.

Discussion

The most significant finding of the present study was the failure to establish any major differences between the follow-up parents and either the experimental or control parents from the initial study. The original study had failed to yield any major differences between the experimental and control groups, so that it may be concluded that whatever important differences may exist between these three groups of parents are not reflected in MMPI scores.

As in the initial investigation, the obtained mean scores of the follow-up parents closely resemble the mean *T*-score of 50.0 expected from psychiatrically normal persons. Again the highest clinical mean score was on the Hysteria (*Hy*) scale and the obtained value of 56.3 is only 0.63 *S.D.* above the expected mean value of 50.0.

[2]All MMPI clinical scale scores are transformed into *T*-scores with a mean of 50 and a *SD* of 10; higher scores are regarded as indicating greater abnormality.

This follow-up group of parents of chronic stutterers may have been expected to be *more* maladjusted than either of the two original groups, but there is no evidence to support this contention. Actually, the three significant mean differences obtained in this study indicated *less* 'abnormality' on the part of the follow-up parents. It should be noted that these obtained differences are small in absolute magnitude and may be easily ascribed to chance factors.

In the original study, there was a significant mean difference between the experimental and control groups on the Taylor Manifest Anxiety Scale (*A-scale*). It was pointed out that the heightened anxiety reflected in this mean difference may be an etiological factor in the development of stuttering or may be a subsequent reaction by the experimental parents to the development of stuttering by their children. The data in the original study did not permit a resolution of these alternative interpretations. The mean *A*-scale score of the follow-up group was between that obtained from the two original groups, lower than the experimental and higher than the control parents. Again this finding is difficult to interpret and additional research will be required to clarify the problem.

In the initial study the children of the 'disturbed' sub-group of experimental parents had a significantly *lower* severity of stuttering rating than did the non-disturbed group. This finding was interpreted as indicating that these deviant parents had participated in the study because of their own personal problems rather than because of any real speech problem with their children. A similar analysis in this follow-up study yielded non-significant results; there was no mean difference in the rating of the severity of stuttering between these two sub-groups. This must be taken to mean that the degree of parental psychopathology, as measured by the MMPI, is not significantly related to the severity of stuttering, at least in chronic stutterers. The disparity between the initial results and the present findings may have resulted from the volunteer procedure used in the initial study. This procedure might have attracted some anxious, upset parents who were overly concerned about their children's normal nonfluencies. The professional referral sources used by the clinic would have screened such persons prior to referral.

The results of this investigation are in virtually complete agreement with those of the overall initial investigation (*3*) as well as with those of the initial MMPI study (*1*), in that they do not support the notion that the parents of stutterers are grossly different in their attitudes and behavior from the parents of nonstutterers.

Summary

The purpose of the present investigation was to cross-validate, with a typical speech clinic group, the findings of a previous study that had found no major differences in the Minnesota Multiphasic Personality Inventory (MMPI) profiles of a group of 100 parents of stutterers and a group of 100 parents of nonstutterers. In the present study, the case records of 50 stuttering children and their parents were drawn from the files of the Iowa Speech Clinic. The 100 MMPI profiles of the parents, 50 mothers and 50 fathers, were compared with the results of the previous study. Only three significant mean

differences between the follow-up group of parents and the two original groups were found. Comparisons of the high-point codes of the follow-up parents and the two original groups revealed no significant differences between the three groups. These results were interpreted as indicating that the responses of the follow-up group were not significantly different from those of the two earlier groups, and as confirming the conclusions of the prior study that the etiology of stuttering is not related to severe psychopathology on the part of the stutterers' parents.

Acknowledgments

This study was supported in part by a grant from the Louis W. and Maud Hill family Foundation of St. Paul, Minnesota. The assistance of Dr. Frederic L. Darley of the State University of Iowa Speech Clinic in the collection of the data and of Dr. Wendell Johnson, the principal recipient of the grant, for his critical reading of the manuscripts is gratefully acknowledged.

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Articulation Of A Group Of Children With Cleft Lips And Palates

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The speech pathology literature abounds with descriptions of the 'typical' speech problems of the individual with a cleft lip or a cleft palate. Some of the descriptions stem from untested hypotheses concerning the articulation difficulties such individuals should have in view of structural deviations of their speech mechanisms. Some descriptions stem from formal studies (*1*, *3*, *4*). However, there appeared to be a need for a very detailed analysis of the articulation skills of a sample of children with cleft lips or palates. Consequently, this study of a group of children with cleft lips or palates was planned to accomplish the following purposes:

1. To describe systematically the accuracy of articulation of the children.

2. To compare the articulation test scores of this group of children with test norms compiled by Templin (*6*) to determine the extent of retardation, if any, in articulation skills of the group.

3. To analyze the patterns of misarticulation of the children.

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Procedure

Subjects. Twenty-five Caucasian singletons born with clefts of the lip and/or palate were selected for this study. Before repair the extent of the clefts of the individuals studied ranged from a unilateral cleft of the lip and alveolar ridge to a complete bilateral cleft of the lip and palate. One individual had a cleft of the lip and alveolar ridge only. Seven subjects had clefts of the hard and soft palates only. The remaining 17 children had clefts of the lip and palate. At the time of the study all of the cleft lips had been repaired, 19 of the clefts of the hard palate had been repaired, and 16 of the clefts of the soft palate had been repaired. None of the children was wearing a speech appliance with a pharyngeal section.

The nine girls and 16 boys ranged in age from three years and seven months to eight years and three months. They ranged in I.Q.-equiva-

lent scores[1] from 81 to 140 with a mean I.Q.-equivalent score of 115. They had essentially normal hearing in the better ear in the frequencies important for speech.[2] The sample was considered to resemble closely enough the population used in Templin's cross-sectional normative study of language development (*6*) to allow comparison of their articulation test results with Templin's norms.

Articulation Examination. Templin's 176-item diagnostic articulation test[3] was used. This test elicits the vowels and diphthongs, the consonants in all the positions in which they appear as singles, and most of the common consonant blends. Colored pictures were presented to each child and a question was asked to elicit one response for each picture. If it proved difficult to elicit the response spontaneously, the examiner followed Templin's procedure and asked the child to repeat the word after the examiner. This procedure appeared justified since the subject's best articulation effort was considered to be a better indicator of the effects of structural deviations of the speech mechanism than the subject's habitual response.

The classification of the 282 sounds elicited from each child is indicated below.

1. Thirteen vowels, elicited a total of 57 times. The [ɝ] as in 'bird' (stressed syllabic), [ɚ] as in 'car' (post-vocalic) or as in 'hammer' (unstressed syllabic), and [l] as in 'bell' (post-vocalic)[4] or as in 'table' (unstressed syllabic) are classified as vowels.

2. Six diphthongs, elicited a total of six times. The [ju], which is sometimes considered to be a consonant-vowel combination, is treated as a diphthong in this study.

3. Twenty-five consonants, elicited as singles or in blends a total of 219 times.

Rating of Peripheral Speech Mechanism. Two judges rated each of seven structures related to speech (lips, teeth, tongue, hard palate, faucial isthmus, nose, and velopharyngeal port) on a three-point scale. A rating of one was given if the judges were practically certain that the condition of the structure would have an adverse effect on speech; a rating of two was given if the judges felt that the condition of the specific structure possibly had an adverse effect on speech; and a rating of three was given if the judges were practically certain that the mechanism in question would have no adverse effect on speech.

Results

Vowels and Diphthongs. The following vowels and diphthongs were

[1]Two children were administered the Revised Stanford-Binet Scale, Form L, one child was given the Merrill-Palmer Scale of Mental Tests, and 22 children were given the Ammons Full-Range Picture Vocabulary Test. I.Q.-equivalent scores were computed from the results of these tests.

[2]A hearing loss was defined as a loss of 30 decibels or more in one of the frequencies tested (250, 500, 1000, 2000 and 4000 cps) or a loss of 20 decibels in three of the five indicated frequencies. If the child could not be tested by pure tone audiometry, speech audiometry was used. In such instances a hearing loss was defined as a loss of 20 decibels above the speech reception threshold for normal young adults.

[3]Information concerning the composition of the test and the test norms, as yet unpublished, was made available through the courtesy of Dr. Mildred Templin. Allusion to the test is made in references *6* and *7*.

[4]It is recognized that the post-vocalic [l] would not be classified as a vowel by some phoneticians. It is the authors' contention, however, that the phoneme in this context is best characterized as vowel-like.

produced correctly 100 per cent of the time by all children: [i], [ɪ], [ɛ], [æ], [ʌ], [ə], [ɑ], [ɔ], [ʊ], [u], [ɑʊ], [eɪ], [ɑɪ], and [ɔɪ]. The [ɚ], [oʊ], [ɝ], and vowel [l] were produced correctly more than 90 per cent of the time by the group as a whole; the [ju] was produced correctly 76 per cent of the time. Excluding any consideration of nasalization, the mean percentage of correct production of all of the vowels and dipthongs was 96 per cent for this group of cleft children, indicating that on the whole these children had little difficulty with the correct production of the vowels and diphthongs.

It should be noted that the [ɝ], [ɚ], and vowel [l] sounds have been included in the analysis of consonant sound articulation in many earlier studies. Since studies of articulation mastery tend to show that the [r] and [l] typically appear later in developmental patterns of articulation skills, it might be predicted that these sounds would be found in error in this study to the extent that the cleft group was delayed in developing articulation skills. In view of the manner of placement of the articulators in the production of these sounds, such a hypothesis would appear to be more tenable than one which assumes that the structural deviations, *per se*, are the most important factors in causing the vowel errors.

Consonants. In the analysis, each blend was subdivided into its elements and all occurrences of each consonant, whether as singles or in blends, were totaled. Table 1 presents data concerning the percentage of correct productions of each consonant for the group as a whole, together with the number of times each consonant was elicited per child. Fifty-four per cent of the total consonant responses were produced correctly by the entire group. These results indicate that the five consonants with which this group of cleft children have least difficulty are [m], [n], [h], [j], and [ŋ]. The five consonants these children misarticulated the highest per cent of the time in order of decreasing difficulty are [z], [θ], [s], [tʃ], and [ʒ]. These findings somewhat resemble those of Cobb and Lierle (*3*) and McWilliams (*4*), who found the [s] and [z] to be the consonants most frequently misarticulated by cleft palate patients.

Certain facts should be considered in interpreting the percentages of misarticulations. Certain consonant substitutions are generally accepted. The [dʒ] is often substituted for [ʒ] in 'garage'; the medial [t], as in 'watermelon,' is usually omitted or has a [d] substituted for it; and the [hw], as in 'wheel,' is often substituted for by a [w]. Discounting the 'garage' response entirely, the [ʒ] was correctly articulated 52 per cent of the time, becoming, with regard to correctness of production, sixteenth rather than twenty-first in rank. Likewise, discounting the medial [t] response, the [t] was produced correctly 44 per cent of the time, changing its rank in regard to correctness of production from seventeenth to sixteenth. Accepting the [w] for [hw] substitution as a correct response, the [hw] was correctly produced 98 per cent of the time, becoming the first consonant in rank with regard to correct production.

Possible Retardation. Table 2 presents information concerning the retardation of the subjects in articulation skills. The norms used in comparing the articulation skill of these cleft palate children with those of 'normal'

TABLE 1. Percentage of correct responses and number and type of incorrect responses made by a group of 25 cleft subjects on each of 25 consonant sounds.

Rank	*Consonant*	*Percentage Correct Responses for Group*	*Number of Possible Responses for Child*	*Total Number of Errors for Group*	*Percentages of Total Number of Errors Which Were of Type Indicated*		
					Substitutions	*Distortions*	*Omissions*
1	(m)	96	12	13	0	38	62
2.5	(n)	88	9	26	42	4	54
2.5	(h)	88	2	6	0	0	100
4	(j)	86	2	7	71	0	29
5	(ŋ)	80	5	25	28	24	48
6	(w)	77	6	34	82	3	15
7	(b)	73	10	68	32	16	52
8	(p)	70	17	128	26	17	57
9	(g)	64	9	80	32	18	50
10	(f)	63	11	101	32	33	35
11	(l)	60	9	90	74	3	23
12	(v)	59	3	31	48	4	48
13	(d)	58	8	85	27	9	64
14	(r)	57	14	150	67	5	28
15	(k)	53	20	237	21	29	50
16	(hw)	42	2	29	100	0	0
17	(t)	39	21	319	34	19	47
18	(ʃ)	38	5	77	18	61	21
19.5	(ð)	37	4	63	65	16	29
19.5	(dʒ)	37	5	79	37	40	23
21	(ʒ)	30	2	35	54	26	20
22	(tʃ)	29	4	71	24	59	17
23.5	(s)	23	26	498	18	54	28
23.5	(θ)	23	8	154	44	10	46
25	(z)	21	5	99	33	39	28
Total			219	2,505			

TABLE 2. Estimate of degree of advancement or retardation of articulation skills of each of 25 cleft subjects on the basis of a comparison of their articulation test scores with the Templin norms.

Subject Number	*Child's Articulation Test Score*	*Articulation Norm for Child's Age Group*	*Age of Child**	*Age Child Resembles in Articulation Skills*	*Approximate Years Advancement or Retardation*
3	138	128.8	5	6	adv. 1
12	129	127.2	4½	5	adv. ½
1	147	141.8	5	5	0
25	130	128.8	5	5	0
13	35	105.3	3½	below 3	ret. ½+
4	149	157.3	7	6	ret. 1
24	96	127.2	4	3	ret. 1
21	69	127.2	4	below 3	ret. 1+
10	68	127.2	4	below 3	ret. 1+
5	116	141.8	5	3½	ret. 1½
22	78	127.2	4½	below 3	ret. 1½+
18	93	128.8	5	3	ret. 2
9	97	141.8	5	3	ret. 2
20	27	128.8	5	below 3	ret. 2+
11	104	147.3	6	3½	ret. 2½
16	144	166.6	8	5	ret. 3
17	137	166.6	8	5	ret. 3
2	60	143.7	6	below 3	ret. 3+
6	69	156.9	6	below 3	ret. 3+
14	62	156.9	6	below 3	ret. 3+
19	44	143.7	6	below 3	ret. 3+
23	117	166.4	7	3½	ret. 3½
8	58	166.4	7	below 3	ret. 4+
15	108	167.6	8	3½	ret. 4½
7	45	167.6	8	below 3	ret. 5+

*In order to conform to the age intervals used in Templin's norms, ages were rounded to the nearest half-year in cases of children under five, to the nearest year in cases over five.

children are the mean scores on a 176-item diagnostic articulation test presented by Templin by age for boys and girls. In this study, all socio-economic groups were combined.

Several factors need to be taken into consideration in interpreting the data in Table 2. First, Templin's normative data do not extend to age levels below three. If a child five years of age receives an articulation score which falls below the norm for the three-year-olds of his sex, all that one can say is that the child is at least two years retarded according to the norms. Second, examination of Table 2 might lead one to believe that the older children show greater retardation in articulation skills than the younger group. This is not necessarily true. Templin's norms may allow one to estimate the full extent of the retardation of an older child whose score does not fall below the norms of the three-year-olds, but they may not afford an assessment of the full extent of the retardation of a younger child whose score falls below the norms for three-year-olds.

About all that one can conclude from the data presented in Table 2 is that it appears that 21 of the 25 cleft palate children tested are retarded in articulation skills to some degree and that 14 of the 25 appear to be at least two years retarded in articulation skills. It seems safe to generalize that on the whole this group of cleft children are retarded in their articulation skills when compared with Templin's norms.

Patterns of Misarticulation. Voicing. The difference between the percentage of correct productions of the voiced consonants and the percentage of correct productions of their voice-

TABLE 3. Rank order of consonants (classified according to manner of formation) in terms of percentage of correct responses by a group of 25 cleft subjects.

Nasal	*Stop-Plosive*	*Fricative*	*Affricate*	*Glide*
1 (m) 96%				
2.5 (n) 88%		2.5 (h) 88%		
				4 (j) 86%
5 (ŋ) 80%				
				6 (w) 77%
	7 (b) 73%			
	8 (p) 70%			
	9 (g) 64%			
		10 (f) 63%		
				11 (l) 60%
		12 (v) 59%		
	13 (d) 58%			
				14 (r) 57%
	15 (k) 53%			
				16 (hw) 42%
	17 (t) 39%			
		18 (ʃ) 38%		
		19.5 (ð) 37%	19.5 (dʒ) 37%	
		21 (ʒ) 30%		
			22 (tʃ) 29%	
		23.5 (s) 23%		
		23.5 (θ) 23%		
		25 (z) 21%		

less cognates was evaluated by means of t for related measures and was found to be significant beyond the one per cent level of confidence (t=3.22, $P_{.01}$ =2.80 for 24 df). The results indicate that this group of cleft children had less difficulty in production of the voiced cognates.

Manner of Formation. The consonants were classified with respect to the manner of formation and then ordered in terms of percentage of correct responses. The data appear in Table 3. Statistical analysis of this material was not attempted. However, the data indicate that in general the nasal consonants are least often defective and the fricative consonants are most often defective with this sample of cleft children. Considering groups of sounds, the plosives seem to give more difficulty than the nasals but less difficulty than the fricatives with this sample of children.

One reasonable implication of these results is that the cleft person does not have as much difficulty building up the momentary oral pressure required for the stop-plosives as he does maintaining oral pressure over a period of time such as would be required in the production of fricatives. It must also be recognized that many cleft cases have malocclusions which would ordinarily have a more serious detrimental effect on the articulation of fricatives than on any other type of consonant. However, only five of the 25 subjects had dentition which was rated as certainly having an adverse effect on speech, while 14 of the subjects were rated as having dentition which was practically certain to have no adverse effect on speech.

The findings of Black (2) are of interest in connection with the results concerning voicing and the manner of formation of the consonants. Black

TABLE 4. Rank order of consonants (classified according to place of articulation) in terms of percentage of correct responses by a group of 25 cleft subjects.

Labial	*Labio-dental*	*Lingua-dental*	*Post-dental*	*Velar*	*Glottal*
1 (m) 96%			2.5 (n) 88%		2.5 (h) 88%
			4 (j) 86%		
				5 (ŋ) 80%	
6 (w) 77%					
7 (b) 73%					
8 (p) 70%					
				9 (g) 64%	
	10 (f) 63%				
			11 (l) 60%		
	12 (v) 59%				
			13 (d) 58%		
			14 (r) 57%		
				15 (k) 53%	
16 (hw) 42%					
			17 (t) 39%		
			18 (ʃ) 38%		
		19.5 (ð) 37%	19.5 (dʒ) 37%		
			21 (ʒ) 30%		
			22 (tʃ) 29%		
		23.5 (θ) 23%	23.5 (s) 23%		
			25 (z) 21%		

noted that the pressure component was greater for certain voiceless sounds than for their voiced counterparts and that greater pressures were required for certain continuants than for certain plosives. Twenty of the subjects in this study were rated as exhibiting inadequacies of the velopharyngeal port mechanism, 12 receiving ratings of one (practically certain adverse effect) and eight receiving ratings of two (possible adverse effect). These ratings, together with the results reported concerning voicing and the manner of formation of the consonants, tend to confirm the predictions that one might make from Black's study.

Place of Articulation. Table 4 presents the order in terms of percentage of correct production of the consonants classified with regard to the place of articulation. The eight consonants most often defective for this group of children are lingua-dentals and post-dentals, which are also classified as fricatives or affricates. The defectiveness of these consonants seems to be related to their manner of formation rather than to the place of articulation. If one accepts as correct the substitution of [w] for [hw], the labials emerge as the group of consonants most frequently articulated correctly, a finding contrary to statements in the literature.

Type of Misarticulation. The percentages of times each consonant was substituted, distorted, and omitted appear in Table 1. The total group of children made 939 omission errors (37%), 864 substitution errors (35%), and 702 distortion errors (28%) in their production of all the consonants. While the basis for the differential frequency of the three types of errors is not obvious in every instance, it would appear that general speech retardation, faulty dentition, lack of oral pressure, and lack of adequate loudness or effort may well be the basis for most of the patterns of error frequency observed.

Singles and Blends. The articulation errors of the subjects were analyzed to determine whether correct production of the consonants occurred more frequently when the consonants were produced as singles or as parts of blends. The consonants used for this analysis were those which were tested both as singles and in blends. They were [m], [n], [ŋ], [p], [b], [t], [d], [k], [g], [r], [l], [f], [θ], [s], [ʃ], and [w]. (It will be noted that definition of [r] and [l] as vowels in certain test items considered by Templin to be consonant blends excluded from this analysis any consideration of blends in the final position an element of which was [r] or [l]; such groups of sounds as [-rst] or [-ngl] became two- rather than three-consonant blends in this analysis. In addition, seven blends were eliminated from the analysis since it was felt that the words in which these were elicited were unfamiliar to the children and that errors might well be due to lack of vocabulary. It was believed that 'caged,' 'kicked,' and 'hopped' were unfamiliar verb forms and 'grasp,' 'chasm,' 'prompt,' and 'glimpse' were unfamiliar because of the infrequency of their occurrence in children's vocabularies.

The percentages of correct production of each consonant as a single and as part of a blend were computed for each child. The mean percentages of correct articulation of the consonants as singles and as parts of blends were computed for each child. The differences between the means were evalu-

ated by means of t for related measures and were found to be significant beyond the one per cent level of confidence (t=3.54, $P_{.01}$=2.80 for 24 df). These results indicate that this group of children had significantly less difficulty articulating the consonants when they appeared as singles than when they appeared as parts of blends.

This finding is contrary to that observed in the studies reviewed by Spriestersbach and Curtis (5). However, in the latter studies subjects with deviations of the peripheral speech mechanism were eliminated. In such groups, where substitutions such as [w] for [r] and [θ] for [s] were common, it is easy to see that combining [r] and [s] with other appropriate consonant elements might tend to facilitate the correct production of the sounds in question by assisting in correct placement of the articulators. The present group, however, exhibited delayed articulation skills characterized most frequently by omission-type errors. Furthermore, it is quite obvious that some of the articulation difficulties are due to defective peripheral speech mechanisms. On the basis of the impact of these two factors alone one might hypothesize that the rapid, precise placement of the articulators required in order to produce the several consonants in a blend overtaxes the ability of the speaker to compensate for his deficiencies. If such reasoning has any validity, then it might, indeed, be expected that consonants would be articulated correctly more often as singles than they would be as elements of blends.

Consistency of Misarticulation. The percentage of times each child articulated each consonant sound correctly was computed. The children were then grouped into percentage deciles according to the percentage of correct productions of each consonant. No child misarticulated all the responses, nor did any child correctly produce all the responses in the articulation test. No individual child consistently made the same type of error for all the consonants. For the group as a whole, 27% of the consonant sounds were correct 100% of the time, and 20% of the consonant sounds were incorrect 100% of the time. Only five per cent of the time did given children produce the same type of misarticulations more than twice, indicating a high degree of inconsistency of misarticulation.

Summary and Conclusions

The speech of 25 children born with cleft lip and/or cleft palate was sampled and analyzed in order to present the following: (1) a systematic description of their articulation skills, (2) an estimate of possible retardation of their articulation ability, and (3) a description of their patterns of misarticulation. The sample was restricted to children between the ages of three and eight who were singletons of the Caucasian race with normal mental ability and essentially normal hearing. A tabulation was made of the 282 sound elements produced by each subject in response to the Templin diagnostic articulation test. These data were analyzed in terms of percentage of correct response for each sound element for each child and in terms of misarticulation for the group as a whole. The articulation test score of each child was compared with the corresponding Templin norm. The following conclusions appear warranted:

1. The subjects used in this study had little difficulty in the articulation

of vowels and diphthongs. The mean percentage of correct production of the vowels and diphthongs for the group as a whole was 96%.

2. The consonants misarticulated more than 60% of the time by this group in order of decreasing defectiveness are [z], [θ], [s], [tʃ], [ʒ], [dʒ], [ð], [ʃ], and [t]. The five consonants giving this group the least difficulty in order of increasing defectiveness are [m], [n], [h], [j], and [ŋ].

3. When compared with the children used by Templin in compiling normative data, this group of cleft children seem to be generally retarded in articulation skills.

4. These children had significantly less difficulty with voiced consonants than they did with voiceless consonants.

5. Indications are that, as a group, the cleft palate children tested had least difficulty with the nasal consonants and greatest difficulty with the fricative consonants.

6. Omission type errors were observed most frequently followed by substitutions and distortions in that order.

7. This group of cleft children had significantly less difficulty producing the consonants correctly when they appeared as singles than when they appeared as elements of blends.

8. These cleft children were generally inconsistent in the misarticulation of consonants.

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Short Test For Use With Cerebral Palsy Children

Orvis C. Irwin

In view of the fact that the administration of extended speech tests is burdensome and fatiguing for cerebral palsy children, the advisability of using short tests needs investigation. It is important for the speech therapist to know to what extent a test composed of a few items is adequate. The following study concerns an analysis of the internal relationships among a selection of five front consonants.

Procedure

In a study of 96 cerebral palsy children from 4 to 16 years of age, tape recordings were made of their articulations of five consonantal sounds each in the initial, medial, and final positions in 15 words. The five consonants are [p], [b], [m], [d], and [t]. The word list appears in the Appendix. The words were presented in two ways: (1) in the form of pictures to which the children were instructed to respond with the corresponding names, and (2) as spoken by the experimenter with the request to repeat the words. All subjects received both kinds of stimulation.

There are four criteria by which the usefulness of a test may be judged. They are: (1) its reliability, (2) the relative difficulty of the items composing it, (3) the discriminating power or diagnostic value of the items, and (4) their uniqueness. The reliability of a test refers to its internal consistency when observations are repeated on the same individuals. The difficulty of an item is calculated by the *proportion* of individuals which pass it. The discriminating power of an item is determined by *which* testees pass it, for if an item is passed by all the subjects regardless of their ability, then the item does not discriminate the individuals attempting it. If, however, the subjects of high ability make better scores than those of low ability, then it has adequate discriminating power or diagnostic value. The uniqueness of an item means that it tests aspects of performance not already tested by other items. That is to say, two items should not duplicate the same function in the test.

In this study the analyses of reliability were made by means of a variant of the Kuder-Richardson formula 20 (*3*). Each correct item in the test receives a credit of one. Therefore, a score equals the number of items to which the subject responds correctly. The Hoyt technique (*1*) which estimates the test reliability by analysis of variance also was used.

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TABLE 1. Correlations for each of six subtests.

Position	*Pictures* r	*Words* r
Initial	.87	.84
Medial	.74	.79
Final	.81	.79

Discriminating power of an item is determined by its correlation with the whole test. With these data, the discriminating power was secured by means of Flanagan's table of product moment correlations (*2*). Uniqueness of items is calculated by their intercorrelations. The phi coefficient was used to determine these intercorrelations.

Results

Since each of the five consonants appears in the three positions in words, the two tests each were broken down for a preliminary analysis into three subtests, or six subtests in all. To determine the reliabilities of these six subtests, formula 12.45 in Walker and Lev (*3*) was used. The coefficients of reliability calculated by means of this formula range from .74 to .87 (see Table 1). It will be noted that for both the picture and verbal test the values are highest for the initial position.

When the scores for the initial, medial, and final positions are pooled for the picture test or the verbal test, the *r*'s should be larger. Hoyt (*2*) uses a formula for the coefficient of reliability which can be applied to each set of such pooled scores. The formula is:

$$r_{xx}=\frac{\sigma^2 \text{between subjects} - \sigma^2 \text{residuals}}{\sigma^2 \text{between subjects}}$$

TABLE 2. Summary of analysis of variance for pooled picture test.

Source	*df*	*ss*	*ms*	*F*
Items (I)	4	17.28	4.32	13.50*
Subjects (S)	95	386.33	4.07	
Residual	380	120.32	.32	
Total	479	523.93		

*Significant at the .001 level.

The results may be seen in Tables 2 and 3. The analysis of variance of the pooled picture test scores gives a coefficient of reliability of .92. The value for the pooled verbal test is .91. These are reasonably high coefficients.

The formula for the standard error of measurement is:

$$\sigma e=\sqrt{\frac{\sigma^2 \text{ residuals}}{n-1}}$$

The standard error of measurement is .057 which is a small value.

The difficulties of the five consonants in the speech of cerebral palsy children are recorded in Table 4. The over-all range is from 33% to 88%, the median being 69%. This is an acceptable range. It means that 33% represents the most difficult item and

TABLE 3. Summary of analysis of variance for pooled verbal test.

Source	*df*	*ss*	*ms*	*F*
Items	4	7.79	1.95	6.29*
Subjects	95	328.32	3 46	
Residual	380	118.21	0 31	
Total	479	454.32		

*Significant at the .001 level.

TABLE 4. Order of difficulty of five consonants in terms of percentages.

Position					
Initial		*Medial*		*Final*	
(p)	78	(t)	33	(b)	47
(t)	81	(d)	67	(t)	48
(b)	83	(p)	71	(d)	52
(m)	86	(m)	71	(m)	53
(d)	88	(b)	72	(p)	65
Mean	83.2%		62.8%		53.0%

88% the easiest for the sample of 96 cases. Table 4 also indicates that the five sounds are easiest for these subjects in the initial position and are most difficult in the final position. The mean percent values are 83.2% for the initial, 62.8% for the medial, and 53.0% for the final position. A particularly interesting finding is that there is a different order of difficulty for each of the three positions. For instance, [p] is the most difficult item in the initial position and the easiest in the final. It is of medium difficulty in the medial position.

The discriminating power of both the picture and verbal parts of the test is indicated in Table 5 by the correlations of each of the items with the whole test. The initial, medial, and final positions are given separately.

TABLE 5. Discriminating power of five consonants in three positions.

	Picture Test			*Verbal Test*		
	Initial	*Medial*	*Final*	*Initial*	*Medial*	*Final*
(p)	.80	.87	.82	.69	.68	.83
(b)	.76	.78	.87	.63	.72	.63
(m)	.71	.78	.86	.53	.40	.83
(d)	.69	.74	.81	.63	.61	.83
(t)	.79	.82	.70	.69	.76	.59

It is evident that the discriminating power of these five consonants is fairly high. The median coefficient is .75. The range is from .40 to .87.

In regard to the uniqueness of items, the intercorrelations of the consonant items for the picture test is given in Table 6, and for the verbal test in Table 7. For the picture test, the phi coefficients run from .27 to .72 with a median of .47; for the verbal test, the range is from .26 to .66 with a median of .47. The value of .75 for the discriminating power is to be contrasted with that of .47 for the intercorrelations.

It is evident, then, that these short tests adequately meet the four criteria of a useful instrument. The coefficients of reliability are .92 and .91, the standard error of measurement being .057. The range of difficulty of the items is from 33% to 88%. The discriminating power or diagnostic value is measured by fairly high product moment coefficients of correlation. The low phi coefficients indicate the uniqueness of the items. It may be concluded that on the basis of these four criteria a short test is a

TABLE 6. Phi coefficients of consonantal items for the picture test.

		(*p*)	(*b*)	(*m*)	(*d*)	(*t*)
	I	.58	.60	.45	.69	
(p)	M	.50	.40	.39	.30	
	F	.52	.47	.47	.42	
	I		.56	.56	.55	
(b)	M		.49	.33	.42	
	F		.48	.48	.27	
	I			.47	.72	
(m)	M			.28	.27	
	F			.67	.34	
	I				.57	
(d)	M				.31	
	F				.51	

TABLE 7. Phi coefficients of consonantal items for the verbal test.

		(*p*)	(*b*)	(*m*)	(*d*)	(*t*)
	I	.41	.34	.38	.46	
(p)	M	.35	.42	.35	.48	
	F	.63	.51	.52	.32	
	I	.60	.66	.66		
(b)	M	.54	.40	.43		
	F	.35	.49	.26		
	I	.57	.60			
(m)	M	.38	.49			
	F	.57	.28			
	I	.53				
(d)	M	.55				
	F	.37				

useful instrument with crebral palsy children.

Summary

A short test of five consonants incorporated in a list of 15 words was given to 96 cerebral palsy children from 4 to 16 years. The consonants are: [p], [b], [m], [d], and [t]. The study concerns an analysis of the internal relationships among a selection of five front consonants. Four criteria for the usefulness of a testing instrument are considered. They are: (1) its reliability, (2) the difficulty of the items, (3) their discriminating power, and (4) their uniqueness. The coefficients of reliability for the verbal part of the test was .91, for the picture test it was .92. The difficulties of the items ranged from 33% to 88%. The discriminating power of the items was high, the median coefficient being .75, whereas the uniqueness of the items had a median coefficient of .47. Thus this instrument meets four essential criteria of a standardized test and it is reasonable to assume that its use with cerebral palsy children is feasible.

Appendix

	Items		*Alternates*
1.	ball	b–	boy
2.	bed	–d	bird
3.	rabbit	–b–	baby
4.	tub	–b	club
5.	cup	–p	soup
6.	ice-cream	–m	comb
7.	milk	m–	man
8.	pig	p–	pie
9.	hat	–t	coat
10.	mama	–m–	umbrella
11.	kitten	–t–	butter
12.	dog	d–	duck
13.	candy	–d–	candle
14.	table	t–	tree
15.	apple	–p–	puppy

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Language Investigation Of Children Suffering From Familial Dysautonomia

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The purpose of this paper is to describe the language and related performance of 12 children diagnosed as having familial dysautonomia. This syndrome was recognized as a clinical entity and described in 1949 by Riley *et al.* (*16*), and more fully defined in two papers in 1952 (*15*) and 1954 (*17*). A team, consisting of the pediatrician, a neurologist, psychiatrist, psychologist, psychiatric social worker, statistican, and the writers, investigated in detail 12 of these children.

According to Riley (*15*), familial dysautonomia 'is characterized by evidences of vegetative dysfunction, such as excessive perspiration, drooling, erythematous blotching of the skin, intermittent hypertension, and defective lacrimation; hyporeflexia and emotional instability are also present'.

Riley (*17*) also says:

> The most striking identifying feature is the failure of the patients to produce normal quantities of tears when crying . . . Other frequent manifestations suggest diffuse involvement of the central nervous system, such as difficulty in motor coordination with retarded motor development, absent or diminished deep tendon reflexes and relative indifference to pain. Particularly distressing symptoms occur in many of the patients. Some take the form of frequent episodes of bronchopneumonia in infancy, others of distressing cyclic vomiting associated with severe personality change. The death rate due to secondary disease, such as intercurrent infection, has been high.

In relationship to the syndrome, the following factors are also of interest: genetic factors, blood pressure lability, and inadequate control of body temperature.

Procedure

At the Pediatric Language Disorder Clinic, Columbia Presbyterian Medical Center, 12 patients suffering from familial dysautonomia were studied. The age range was from three years six months to 12 years 10 months. There were seven boys and five girls (see Table 1). The intelligence of these patients was not assessed quantitatively since it was felt that in children with organic involvement an intelligence quotient is not representative of actual intellectual potential. All but one child were evaluated more than once. The interval between the first and final sessions was from eight to 21 months. The second series of

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TABLE 1. Sex and age distribution and intervals between first and last tests.

	Child	Sex	Age when First Seen	Age when Last Seen	Interval in Months
1.	D.B.	F	4.7	5.8	13
2.	K.E.	M	10.6	12.1	19
3.	A.G.*	M	3.6	4.8	14
4.	J.G.*	F	6.11	7.11	12
5.	J.H.	F	12.10	14.4	18
6.	P.K.	M	5.3	5.11	8
7.	G.L.†	M	6.0		
8.	R.N.	M	4.3	6.0	21
9.	E.S.	F	5.6	6.10	16
10.	J.S.	F	3.7	4.9	14
11.	H.R.	M	9.10	11.5	19
12.	M.W.	M	6.2	7.4	14

*Brother and sister.
†Child seen only once.

observations was used to test some performances refused by the younger children the first time. It also provided an opportunity to observe certain aspects of maturation. Recordings were made of each child's speech. A parent (in most cases the mother) provided the history. A series of tests was presented to each child and the results evaluated on the basis of some of the available norms and clinical experience.

In certain categories tested, norms could not be defined since specific criteria have not as yet been established. Moreover, some performances were only judged grossly since the task set for the team was to get an overall picture of these children's functioning.

Language disturbances were defined as disturbances of speech, reading, and writing. Ability to read printed and written language was not tested due to the fact that eight out of the 12 children were under seven years of age at the initial testing and two of the remaining four had such severe visual defects as to render them virtually unable to cope with printed symbols.

Language was regarded as patterned behavior. Underlying those language disturbances which are not primarily emotionally determined, there are significant deviations in motor, perceptual, visuo-motor, and conceptual performances which become apparent only after careful investigation. Therefore, tests were included which might give information as to the child's integrative and organizational capacities.

Testing of the emotional aspects of communication was not included since the team's psychiatrist and psychologist carefully investigated these areas.

The following criteria were used in the areas investigated:

History

Sitting and Walking

Using the Gesell (*6*) developmental norms, a child was said to be late in sitting alone if he had not done so by nine months. Walking without sup-

port was judged to be late if the child was not able to manage by 18 months (*6*).

Words and Phrases

If the first words had not been spoken by 24 months, the child was felt to be late in this respect (*6*). The child was judged to be delayed in combining words only if he had not done so by 30 months. (Gesell (*6*) points out that by 21 months combinations of words are encountered in nearly all normal children.)

Present Status

Motor Coordination

Gross motor skills like gait, running, and balance were observed; also activities demonstrating finer motor control.

Gross Coordination

a. Gait. Ataxia, awkwardness, unsteadiness, and tumbling were considered to be deviations.

b. Running. Running, according to Gesell (*6*), begins at two years. If the child could not run at all or if he stumbled or had difficulty in running 20 feet at the age of three and one-half years, he was judged to be inept.

c. Balance. According to Myklebust (*12*), using standards taken from Bayley, a child of approximately 49 months should be able to hop on his right foot two or three times. In his Tests of Motor Proficiency, Oseretsky (*3*) provides criteria for judging balance in children from four to 16 years of age. Adhering grossly to his standards, balance was felt to be poor if, at the appropriate age, the child was unable to perform the skill required.

Fine Coordination. The child was observed in manipulation of small objects, in insertion of pegs into a board, and in graphic activities. If tremor, severe awkwardness, frequent dropping of objects, or fumbling occurred, or if the child of six or over handled a pencil particularly clumsily, his finer motor performance was considered to be deviating. It should be added that only 10 out of 12 children were tested in this area since the severe visual difficulties of the remaining two obviously interfered with finer motor control.

Visuo-Motor Ability

The Bender-Gestalt test (*2*) was used to evaluate visuo-motor functioning. This test has been found useful in the diagnosis of cases showing some central involvement. According to Silver (*20*), the Bender-Gestalt test measures the following complex series of functions: '(a) the visual function, that is the reception of visual stimuli, (b) the integrative function, in which the visual stimuli are sifted through the experiences and the organic matrix of the individual, and thus interpreted, and (c) the motor function, in which the visual percept is translated into the motor activity of drawing'.

Since the Bender-Gestalt test has been standardized as to age, deviations from the standard were judged to be manifestations of inferior visuo-motor ability. Only 10 out of 12 children were tested for reasons already cited.

Patterning and Organizational Capacities

According to Strauss and Kephart (*21*), it is in the area of organization of relationships that children with central disturbances have trouble. Out of the mass of incoming stimuli the individual has to construct certain patterns and schemata. From the multitude of such schemata were chosen some which are involved in spatial, temporal, and figure-background relationships as being particularly pertinent to language.

Temporal Organization. In the auditory area the ability to grasp and reproduce sequences was tested by giving the children a series of tapped out patterns to imitate. This seemed to be a significant test since, for spoken language, organization in time is an important factor. If the child was unable to imitate tapped-out patterns the length and complexity of which were increased with various age levels, he was felt to be inferior in temporal organization.

Spatial Organization. Adequacy in this area was judged by performance on the Bender-Gestalt test (*2*) and the Goodenough Draw-a-Man test (*9*). The latter was chosen because spatial concepts are originally derived from a person's image of parts of his own body and their relationship to each other. Vernon (*24*) emphasizes the close parallels between development of spatial concepts and body schema. Gross difficulties with spacing of the configurations, overlapping of figures, poor use of the framework of the page, or rotational tendencies on the Bender-Gestalt, as well as severe deviations in proportions and relationships of body parts on the Goodenough, were noted as evidences of difficulty with spatial organization. Parallel investigations were done by Galefret-Granjon (*5*), who uses these tests among others for evaluation of spatial relationships in cases of dyslexia. Only 10 of the 12 children were tested for spatial organizational ability.

Figure-Background Organization. According to Goldstein (*8*), inability to distinguish between the foreground and the background of a given motor, sensory, or ideational configuration has been found to be a significant phenomenon in brain-injured individuals.

Figure-background organization was judged by performance on the writers' adaptation of the Strauss-Lehtinen cards (*22*), which were flashed by hand for just less than a second. Exposure time was increased for the younger children. When a child missed three or more figures after two or more exposures of each card, his performance was felt to be deviating in this area. Eleven children out of 12 gave responses to this test; the severity of the visual defect in one of them made it impossible for him to respond to the stimulus.

Biological Functions Related to Language

Those biological functions were tested which are made use of in the process of speaking; namely, breathing, swallowing, chewing, and sucking.

Breathing. In his evaluation of breathing in cerebral palsied children, Palmer (*13*) considered breathing unsatisfactory if it was arrhythmic or explosive. If either were observed in children with familial dysautonomia, or if, in addition, severe hypotonicity and excessively fast rate were noted, breathing was felt to be deviating. Fairbanks (*4*) does not necessarily consider shallow breathing a departure from the normal pattern.

Swallowing. Swallowing was judged to be atypical when initiation was difficult or delayed, when gagging occurred, or when part of the bolus of food was expelled in the process.

Chewing. Chewing was felt to be deviant if the process seemed inordinately time consuming, if the child usually used his incisors, if jaw movement was limited, or if, instead of using his teeth, the child's chief means of breaking down food was by pushing it with his tongue against the palate.

Sucking. Sucking was said to be poor if the child of three and one-half or older was unable to suck or did so only with great difficulty.

Movement and Control of Peripheral Speech Organs

The control of lips, tongue, and velum was observed, as well as diadochokinesis and drooling.

Lip Movement. Movement of lips was felt to be deviant if the child was unable to purse and spread the lips, if excessive movements or overflow were noted, if there was pull to either side, if lip movement was stiff, and if closure was poor.

Tongue Movement. Tongue movement was said to be unsatisfactory if extension was limited, if after the age of four years the child was unable to flex the tongue to both sides, or if, after the age of five, voluntary elevation was absent or poor.

Velar Movement. Velar movement was judged to be inadequate if very sluggish, if elevation was absent, or if movement was asynergic.

Diadochokinesis. Using West's (*25*) definition, diadochokinesis was accepted as being 'the act . . . of repeating at maximum speed some simple, cyclical, reciprocating movement'. The child was given four consonant combinations to repeat. If movement was arhythmic or slow, or if the child under the age of five was unable to continue two combinations for five seconds, diadochokinesis was said to be inferior.

Drooling. Drooling was placed in this category arbitrarily since in the case of children suffering from familial dysautonomia it is difficult to determine whether drooling occurs on the basis of hypersalivation, of poor control of articulatory movements, or because of difficulty with swallowing. If drooling was observed it was noted.

Voice

Deviations noted in vocal functioning were those in quality, pitch, loudness, and tonus; also fading.

Quality. Using Fairbanks' (*4*) designations, nasality, breathiness, hoarseness, and harshness were marked as deviant.

Pitch. Pitch was judged to be atypical by three of Fairbanks' (*4*) criteria: too high, too low, or inflexible. The criterion of poor control as manifested by sudden fluctuations between too high and too low a pitch was added.

Loudness. Deviations were assumed to be present if, according to Fairbanks' (*4*) criteria, voice was too soft or too loud; or if, in addition, there was poor control of loudness.

Vocal Tonus. Vocal tonus was observed and extreme hyper- or hypotonicity were noted as deviant.

Fading. Fading was observed in a separate subcategory, although in some cases fading was felt to be a function of hypotonicity or possibly of poor control of loudness. Fading was assumed to be present when there was marked decrease in loudness as the child progressed from syllable to syllable in a word or phrase. Since it is difficult to measure fading by objective means, clinical judgment was used to gauge deviations.

Language

Receptive Aspects

a. Hearing. Crude hearing tests required the child to choose from a toy box specific objects the names of which were whispered from a distance of approximately four feet behind his back. If the child failed the same stimulus twice, gross hearing capacity was considered uncertain enough to warrant further investigation.

b. Understanding. In judging un-

derstanding of verbal material, interpretation both of single words and of a connected story was tested. In the former, the child was asked to point to pictures named by the examiner.

In evaluating understanding of connected verbal material, the three- to four-year-old child was asked to tell the point of a story which involved a single incident; the four-to-five-year-old one involving some concept of time; and the six-year and older child a joke involving a verbal absurdity. If the child failed at the appropriate level, understanding of verbal material was judged to be poor.

c. Auditory Memory Span. In testing auditory memory span, the child was presented with syllables containing different consonants and vowels such as 'bah-moo'. Since consonants and vowels were combined as Beebe (*1*) did in her study in 1944, her norms were used. Beebe required the child of five to seven years to repeat four nonsense syllables, the child of seven and above to repeat five nonsense syllables. In this study, the four-year-old was expected to repeat three nonsense syllables instead of four. Auditory memory span was considered to be short if the child's performance fell below these expectations.

Expressive Aspects

a. Articulation. Using Templin's (*23*) findings, articulation was considered deviant if, by the age of eight for boys and seven for girls, errors in vowel and consonant pronunciation were observed. For the younger child, intelligibility was considered a crude indicator of articulatory ability. If it was not possible to understand the essence of what a child of four, five, or six said, it was concluded that one of the factors involved was poor articulation.

b. Intelligibility. Intelligibility was rated separately. The criterion for judging intelligibility was the ability of the trained listener to understand the child's verbal output at least on second repetition.

c. Rate. Rate of speech was considered deviating if too fast, too slow, or fluctuating between the two.

d. Rhythm. Rhythm was judged to be poor if staccato, jerky, or if there were clonic iterations or tonic manifestations interrupting the flow of speech.

Organizational Aspects

a. Grammar. Grammatical construction was observed in the child's spontaneous conversation. Grammar was considered poor if a child used immature forms for his age. Criteria were taken from the material presented by McCarthy (*10*) on this subject. Taking age level into consideration, deviations included excessive use of incomplete sentences, a disproportionate use in a sentence of any part of speech, and difficulty in using any but the present tense.

b. Story Telling. The smaller children were asked to tell the story, The Three Little Pigs or, The Three Bears. The older ones were required to retell one they had seen on television or at the movies. The performance was considered inadequate if the child beyond the age of four and one-half was unable to produce a very crude outline of the content. If the older child's story was poorly organized, if he failed to get the point across, or if he omitted essential items, he was considered to have done poorly in this area.

Categorical Aspects

a. Naming. Goldstein (7) makes a distinction between naming and the use of words in ordinary conversation.

Some children have what appears to be a good use of the idiom on a purely auditory-perceptual basis, while they have great difficulty evoking the word concept when presented with a specific demand. The younger children were shown a series of simple pictures representing common objects. The

TABLE 2. Frequency of occurrence of specific deviations.

Areas Tested	*Total Number Children Examined*	*Number of Children with Deviations*
I. History		
A. Sitting	12	3
B. Walking	12	9
C. Speech		
1. words	12	7
2. phrases	12	8
II. Present Status		
A. Motor Coordination		
1. gross coordination		
a. gait	12	10
b. running	12	11
c. balance	12	10
2. fine coordination	12	12
B. Visuo-Motor Ability	10	8
C. Patterning and Organizational Capacities		
1. temporal organization	12	6
2. spatial organization	10	7
3. figure-ground organization	11	6
D. Biological Functions Related to Language		
1. breathing	12	8
2. swallowing	12	9
3. chewing	12	9
4. sucking	12	7
E. Movement and Control of Peripheral Speech Organs		
1. lip movement	12	12
2. tongue movement	12	8
3. diadochokinesis	12	10
4. velar movement	12	6
5. drooling	12	11
F. Voice		
1. quality	12	10
2. pitch	12	10
3. vocal tonus	12	9
4. fading	12	8
5. loudness	12	7
G. Language		
1. receptive aspects		
a. hearing	12	0
b. understanding	12	2
c. aud. mem. sp.	12	7
2. expressive aspects		
a. articulation	12	6
b. intelligibility	12	6
c. rate	12	10
d. rhythm	12	5
3. organizational aspects		
a. grammar	12	5
b. story telling	7	5
4. categorical aspects		
a. naming	12	8
b. definition	10	6

older ones were given pictures representing words of a higher order of abstraction; they were required to be more specific in their responses. If the children at appropriate age levels had considerable trouble in evoking names, they were considered to have difficulty.

b. Definitions. Since children over five years are expected to define objects in terms of function, inability to do so at this age or older was judged to be a sign of weakness in categorical development. Older children's responses were judged qualitatively. If the definitions of the children were found to be more than usually concrete for their age level, they were assumed to have difficulty with categorical performance. Only 10 children out of 12 were tested since the remaining two were still under five years of age by the time of the second testing.

Findings and Discussion

Data on each child's performance in every category were based on clinical observations. A child's performance was classified as deviant if a deviation was clearly present and consistent and there was little or no doubt that abnormality existed. All marginal performances were considered to fall within the normal range. Table 2 shows the number of patients tested who were rated as deviant in each category.

The results should not be considered final because of the subjective nature of much of the examination, because of the absence of a control group, and because the broadness of scope involved in the testing of a multiplicity of items allowed the outlining of only general trends. Since certain developmental processes were involved, the wide age range also presented problems. Two separate, though interacting, factors had to be considered: maturation and degree of pathological involvement. However, allowing for these reservations, reference to the table shows that there emerges a fairly well defined picture.

The findings in visuo-motor ability agree with the observations of Goldstein (*8*), Bender (*2*), and Strauss (*22*), who maintain that visuo-motor difficulties are frequent in individuals who show a degree of central involvement.

All but one subcategory in the area of movement and control of peripheral speech organs were found to show deviations. This is not surprising since three of them (movements of lips and tongue, and diadochokinesis) are probably closely related to difficulties with finer motor control (see Table 2). The only subcategory in which deviations were less frequent is that of velar movement, which half of the children found difficult. It should be stated, however, that precise measurements of velar movements are hard to obtain by means of clinical observations.

Of the 10 children out of 12 judged to have poor voice quality, nine were observed to have nasal voices. This fact is of interest, considering that only six children had difficulties with velar movement. Several possible explanations present themselves: (1) The difficulty of measuring velar movement by clinical observations; (2) The question as to whether velar movement as produced under strong stimulation (in response to the command to repeat specified units) is the same as that found during habitual conversation; (3) The relation of action and position of the tongue to nasality (*11*); (*4*) The relationship of

the hypotonicity of the children in the dysautonomic group to the relatively severe nasality observed.

Eight of the 10 children showing difficulty with pitch had monotonous voices. Attention is drawn to the fact that in some cerebellar conditions voice is strikingly monotonous (*26*).

The finding of fading in eight out of 12 children might be related to overall hypotonicity, though not unlike monotony, fading is also frequently a feature in neurological conditions. Six of the seven children with deviations in loudness showed poor control. In other words, their voices fluctuated between being too loud and too soft. These fluctuations might possibly be related to fading, since five of the children manifested both fading and poor control. It is likely that tonus, loudness, and fading are all interrelated.

Similar Speech Syndromes

Speech patterns similar to those observed in children who have familial dysautonomia have been reported with other neurological disorders. Worster-Drought (*26*) reports speech manifestations in cases of congenital suprabulbar agenesis in which there are:

> . . . varying degrees of weakness and spasticity of the lips, tongue, soft palate, pharyngeal and laryngeal muscles, either separately or combined. Speech may be extremely dysarthric, being slurred and indistinct with deficient lingual and labial sounds. In severe cases, the lips, tongue and soft palate may be immobile. Sometimes the child is able to protrude his tongue to a certain extent but is unable to curl it upwards and lateral movements are impossible. In milder cases, the paresis of the muscles of articulation is of lesser degree and isolated weakness of either the lips, tongue or soft palate may occur. Not infrequently, owing to the weakness of the lips and impairment of swallowing, the accumulation of saliva is uncontrolled and consequently the child dribbles continually.

Peacher (*14*) points out that in bilateral pyramidal lesions in pseudobulbar palsy there is dysphagia and dysarthria. In speech, 'respiration and rhythm are largely implicated' if the pontine pathway is involved. In articulation bilabials and lingua–dental consonants and lingua–rugal sounds are most often distorted. Peacher mentions that bulbar speech is usually described as flaccid. Peacher also says that 'certain aspects of the dysarthrias are more prominent due to lesions in certain areas, *e.g.*, rhythm in cerebellar implication, articulation in pyramidal involvement, respiration and phonation in the basal ganglia disturbances . . .'

Rutherford (*19*) found that in children with extra-pyramidal lesions speech may be louder, lower pitched, irregular, monotonous, and aspirate, which was felt to be due to interference with the respiratory apparatus.

Zentay (27) describes corticostriopallidorubrobulbar tract lesions as affecting maintenance of 'the required tone, rate and depth of respiration, pitch of voice, tempo of speech'. He refers to both 'hypotonic-hyperkinetic' and 'hypertonic-hypokinetic' manifestations. In the former there is hyperkinesis of the vocal cords, involuntary diaphragmatic movements, and incoordination of various movements, all of which results in a weak voice and deviating pitch. In the latter, speech is hesitant, halting, and delayed; it is also lacking in modulation and sometimes blurred.

Robbins (*18*) discusses patients with 'bulbar speech' as having marked elision of syllables with slurring and

high pitched, hoarse, monotonous, and nasal voices.

Comparing the speech picture in the various conditions described in the literature with that of the dysautonomic group one finds hypotonic manifestations in the speech musculature are far more frequent than hypertonic ones. In any case, the speech examination seems to indicate that the whole of the nervous system is implicated. Only further investigation will show whether bulbar speech manifestations, in addition to basal ganglia ones, are of particular significance.

Summary

A study was done of 12 children suffering from familial dysautonomia. Findings revealed that the patients studied had severe difficulties with gross and finer motor control, and associated difficulties with movement and control of articulators. They had trouble also with biological activities underlying speech, such as breathing, swallowing, chewing, and sucking. The voices of these children were deviating: quality was nasalized and pitch was monotonous; there was poor control of loudness and a tendency to fading. Auditory memory span was short, though hearing and understanding presented no problems. In the area of expressive language, these children showed fluctuations in rate. Articulation and intelligibility were inferior to what one would expect in the general population. These children's rhythmic abilities did not seem to be particularly good. Difficulty with story telling was relatively frequent. Categorical behavior seemed to be poor. The implications of these findings were discussed in relation to observations of similar speech conditions reported in the literature.

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What Makes An Effective Public School Speech Therapist?

Margaret Hall Powers

Through experience in directing the speech correction program of a large city public school system, the writer has become increasingly impressed with the importance of trying to define and describe, more adequately than has yet been done to date, the scope and content of the public school speech therapist's work. The outline presented (see Appendix) grew out of experience in observing on the job some 150 public school speech therapists, current and past members of the writer's staff. This experience has included conducting in-service training with them, and the study of their relative degrees of effectiveness in therapy and in relationships with adults in their work. These speech therapists represent a wide range of academic generations, of previous types of experience, and of university training programs.

The work of the public school speech therapist is complex and multisided. To be successful in it, a person must have certain characteristics, skills, and attitudes. Perhaps because of the complexity and lack of definition of this work, it has not been well understood outside the ranks of those actually engaged in it.

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On the one hand, educational administrators, under whose jurisdiction the school speech therapist works, tend to underestimate the highly technical and specialized nature of the work and the preparation needed for it. They tend to see it as essentially the same in preparation and function as classroom teaching, with a little extra specialization in and responsibility for the area of speech. On the other hand, college professors who train young people for public school speech correction too often lack direct experience in this work themselves. They tend to see the school speech therapist's work as being essentially the same as any other clinical speech therapy, except that it happens to go on within the organizational framework of a school, a difference which actually makes a very large difference. They overlook the various functions, in addition to therapy, served by the school speech therapist but not involved at all in most clinical positions —speech screening of child populations, to mention but one. This lack of understanding of the details of the public school speech therapist's work has stood in the way of adequate preparation in the college training program for certain aspects of the work.

Some of the controversy of recent years concerning the proper training of public school speech therapists

arises because we have not had a detailed job description or job analysis of the actual, realistic nature of the work of these specialists. Discussion of what constitutes appropriate training for public school speech correction work should *follow*, not *precede*, such an analysis.

The outline should serve several distinct purposes, among which the following five are of particular importance.

First, the outline should provide a measuring stick with which a public school speech therapist can evaluate his own effectiveness. It should help the individual therapist to consider systematically the many facets of his work and to identify his own strengths and weaknesses. At the very least, it may call to his attention certain functions or duties which he has overlooked or under-stressed. It was primarily with this purpose in mind that the outline was first developed. The members of the staff report that it has been helpful to them in developing more objective self-evaluation of their own effectiveness.

Second, the outline should provide supervisors of speech correction with a systematic instrument for appraising the work of speech therapists. It should help him to identify an individual therapist's weak spots and to work with him more effectively in improving his skills. It should help the supervisor to objectify what he is looking for and to consider the supervisee from every point of view. The use of the outline reveals very quickly whether an individual therapist is uniform or consistent in his degree of effectiveness. The outline thus forms a useful basis for the supervisor's conference with a therapist, enabling him to indicate points of excellence in the therapist's work as well as those in which modification and improvement are needed.

Third, the outline should be helpful to school principals, special education directors, or other persons not trained in speech correction but responsible to some extent for the administration of the speech correction program. It should give the administrator understanding of what he should expect of the speech therapist, and the nature of the speech therapist's work, his problems, and needs. He should gain a new comprehension of and respect for the complexity and specialized character of this type of work and be enabled to cooperate more intelligently than he could otherwise.

Fourth, the outline should be of value to university professors who are training speech therapists for the public school field. It can be used as a partial outline for courses such as those now offered in a few universities and variously entitled 'Public School Methods', 'School Procedures in Speech Correction', *etc.* All of the functions referred to in the outline should be dealt with in such a course so that students will be prepared to serve capably later in all of these capacities. The outline should at least reveal numerous functions not served by clinicians working in other settings.

Fifth, the outline should be of help to college students who are considering public school speech correction as a possible career. It will enable them to understand in considerable detail the nature of the work and to evaluate their own interest in entering it.

Although the following job analysis of the work of the speech therapist in the public schools grows out of experience in the speech correction

program of the Chicago Public Schools, it will probably, except for minor details, fit most public school speech correction programs reasonably well. The outline originally contained three columns at the right, headed 'Excellent', 'Satisfactory', and 'Unsatisfactory', where each item could be checked independently. In using the outline, some readers may wish to use this or some similar rating system for each item. For certain purposes this might be advantageous.

Appendix

I. Organization of the Speech Correction Program

A. Effectiveness with which the speech correction program is first introduced

B. Efficiency in planning weekly distribution of time

C. Efficiency in initiating program at the beginning of each new term

D. Effectiveness of case-finding and selection:
   1. Management of grade 1B or other speech screening:
      a. Efficiency in carrying out screening procedures
      b. Reliability of speech evaluations made
      c. Use made of results with teachers and principals
      d. Use made of results with parents
   2. Efficiency in securing teacher referrals:
      a. Systematic plan to secure referrals from teachers
      b. Handling of referrals when made
      c. Interpretation of results to teachers
   3. Judgment in selection of cases for therapy

E. Planning of therapy schedule:
   1. Efficiency in arranging daily schedule
   2. Skill in grouping of pupils for therapy
   3. Provision for individual therapy when needed
   4. Provision for parent and teacher conferences
   5. Provision for case record maintenance
   6. System for informing principal of therapy schedule
   7. System for informing teachers of therapy schedule for their pupils

F. Efficiency of operation of therapy schedule:
   1. Plan for insuring attendance and punctuality of pupils
   2. Resourcefulness in adapting to unavoidable interruptions in schedule
   3. Flexibility in regrouping cases as needed

G. Maintenance of individual pupil record:
   1. Thoroughness and promptness in recording identifying data and case history information
   2. Completeness of recording speech examination and diagnostic data
   3. Systematic recording of pupil attendance
   4. Adequacy of therapy record
   5. Systematic recording of case conferences
   6. Adequacy of summarization and recommendations before transfer of pupil
   7. Responsibility shown in forwarding records to new school or making appropriate disposition of them
   8. Professional appearance and neatness of records

H. Maintenance of other clinical records:
   1. Accuracy and neatness of enrollment roster
   2. Accuracy and completeness of waiting list record
   3. Systematic filing of speech screening records and summaries
   4. Maintenance of current inventory of books, equipment, and supplies

I. Reliability and speed with which necessary record keeping is done

II. Examination and Diagnosis of Cases

A. Examination practices:
   1. Systematic appraisal of every new case
   2. Intensive examination of special cases
   3. Systematic recheck of previous cases at beginning of school year

B. Knowledge and skill in utilizing diagnostic procedures for:

1. Stuttering cases
2. Articulation cases
3. Voice cases
4. Cleft palate cases
5. Cases with neurological impairment
6. Others

C. Awareness of and skill in interpreting:
1. Organic factors (structural, motor, sensory)
2. Environmental or learning factors
3. Emotional factors

D. Initiative shown in utilizing for further information or assistance:
1. Resources within the school itself
2. Resources at central offices of the Board of Education
3. Resources in the community

E. Ability to weigh clinical evidence in arriving at an understanding of a case

F. Reliability of the diagnoses made

III. Speech Therapy

A. Handling of children:
1. Skill in securing and holding interest
2. Ability to motivate pupils to improve their speech
3. Warmth and confidence of therapist-child interaction (permissiveness, friendliness)
4. Courtesy to child (introduction of visitors, avoidance of criticism before others, etc.)
5. Ability to maintain good order and discipline
6. Ability to maintain a business-like working situation
7. Attention to good speech posture of children (erect, hands away from face, etc.)
8. Skill in motivating adolescents

B. Planning of therapy:
1. Ability to formulate long-range objectives and plan an advantageous therapeutic sequence for each case
2. Judgment regarding the immediate, specific needs of each case
3. Quality of lesson plan preparation for:
   a. Stutterers
   b. Functional articulation cases
   c. Organic cases
   d. Other types
4. Flexibility in modifying plans as needed to adapt to child's response

C. General management of therapy:
1. Physical aspects:
   a. Initiative in securing best space available
   b. Utilization of room, attempts to make it interesting and attractive, good arrangement of furniture
   c. Initiative in securing needed furniture, educational materials, equipment
   d. Convenient arrangement of materials for ready accessibility during therapy
   e. Convenient arrangement of records for ready reference
   f. Work table kept free, uncluttered
   g. Therapist seats self so that face is well lighted
   h. Attention to comfortable seating of children (correct chair size, uncrowded arrangement, able to see and hear therapist, adequate light on work materials, child not facing direct sun or glare, etc.)
2. Effectiveness in conducting speech therapy:
   a. Skill in utilizing the dynamics of a group situation therapeutically
   b. Ability to individualize therapy for the various members of a group
   c. Perceptiveness regarding the emotional reactions of each child in the group
   d. Balance between over-direction and too little direction
   e. Appropriate amount of talking by therapist himself
   f. Ability to give clear directions and explanations and to notice individual difficulties in comprehension of them
   g. Resourcefulness in finding or making new, attractive, effective materials, and devising original techniques
   h. Judgment regarding level of difficulty of materials and techniques (appropriate to age, social maturity, and speech development of child, and to type of case)
   i. Efficient utilization of materials and techniques (to avoid loss of time and to give maximum speech practice)

j. Resourcefulness in finding other techniques for pupils who fail to respond to the usual methods
k. Integration of speech therapy with current classroom activities and materials
l. Efficient use of speech therapy period (brisk tempo without haste; good judgment regarding techniques most effective and those less essential)
m. Use of sufficient variety to hold interest and avoid fatigue
n. Skill in devising and motivating pupil assignments for out-of-class work

D. Therapeutic competence with the various disorders:
1. Functional articulation cases:
a. Judgment regarding an advantageous starting point for therapy (specific sound)
b. Effectiveness of first introduction of new sound
c. Skill in auditory training
d. Skill in supplementary approaches when needed (visual, phonetic, kinesthetic)
e. Skill in articulatory production training
f. Skill in training for carry-over
g. Utilization of classroom teachers in follow-up
h. Utilization of parents in follow-up
2. Stuttering cases:
a. Judgment regarding directness of the approach to use in therapy
b. Quality of work with indirect approach through parents and teachers (mainly primary stutterers)
c. General quality of work with secondary stutterers:
Capacity to analyze specific difficulties of case and evaluate their relative priority for attention
Skill in handling emotional aspects of problem
Skill in handling symptom control and modification
d. Therapist's consciousness of a definite *plan* of therapy
e. Skill with which therapist coordinates home and school management of child's speech
3. Voice cases: competence in therapy
4. Cleft palate cases:
a. Competence in speech therapy
b. Effectiveness in coordinating work with that of other specialists involved
5. Management of acoustically handicapped (those with mild loss but not in a special class)
6. Management of cerebral palsied or other neurologically handicapped:
a. Competence in speech therapy
b. Effectiveness in coordinating work with that of other specialists involved
7. Effectiveness in managing speech work with mentally handicapped children

E. Evaluation of the results of therapy
1. Objectivity regarding therapist's own therapy and its results
2. Flexibility in modifying therapy in relation to results of evaluation
3. Initiative in seeking further information or consultation on unresponsive cases
4. Continuing observation and evaluation of child's problems
5. Judgment regarding discontinuance of therapy

IV. Professional Relationships

A. With personnel of local school:
1. General:
a. Ability to win personal acceptance from school staff
b. Skill in promoting interest in and understanding of the speech correction program
c. Identification with the school and its activities as a participating member of the school staff
d. Attendance at teachers' meetings and other school events when schedule permits
e. Familiarity with the special problems and characteristics of the school and its neighborhood
f. Familiarity with the resources of the school and its neighborhood
2. With school principal:
a. Skill in presenting objectives and policies of speech correction program
b. Ability to gain principal's confidence, understanding, and support

c. Tact and judgment in handling difficulties or differences of opinion
d. Degree to which principal is kept in touch with the program through conferences or written reports

3. With classroom teachers:
a. Ability to understand teacher's problems and points of view
b. Tact and efficiency in handling matters of routine
c. Ability to secure active interest and cooperation of teachers
d. Degree to which teachers are informed of progress of their pupils
e. Utilization of opportunities to talk to teacher groups or advise on classroom speech improvement activities

4. With other school personnel: Degree to which therapist utilizes the following in his work with cases:
a. School psychologist and/or psychiatrist
b. School nurse
c. Special subject supervisors or others

B. With central administration
1. With speech correction supervisor:
a. Reactions to supervisor's suggestions or criticisms
b. Degree to which therapist tries to carry out recommendations
c. Frankness in soliciting help when needed
d. Judgment in referring potential difficulties to supervisor
e. Willingness to carry out special duties
f. Cooperativeness in accepting assigned schedule of work

2. Routines:
a. Punctuality in filing required reports
b. Accuracy of reports
c. Reliability in notifying administrative office of absence, or variation in schedule
d. Punctuality at schools and at staff meetings

C. With parents and siblings of cases:
1. Systematic notification to parents of newly enrolled children
2. Attempts to contact as many parents as possible
3. Skill in handling parent interviews
4. Ability to secure parents' interest and active cooperation
5. Degree to which parents are informed of child's progress in speech
6. Initiative in seeking opportunities to talk to parent groups or conduct parent classes and demonstrations
7. Initiative in getting cooperation of older brothers and sisters for home follow-up when desirable

D. With community and professional persons and groups:
1. Utilizes opportunities to inform professional and community groups about speech correction through talks, newspapers, radio, television
2. Ability to deal professionally with physicians, dentists, social workers, and others involved in cases

V. Personal Characteristics

A. Appearance:
1. Appropriateness and neatness of clothing
2. Grooming (hair, nails, makeup)
3. General impression created (posture, mannerisms, etc.)

B. Speech, voice, language:
1. Articulation
2. Voice patterns
3. Effectiveness in expressing self

C. General cultural level

D. Intellectual capacity

E. Health, regularity of attendance

F. Manner and personality:
1. Ability to inspire liking in others
2. Ability to inspire respect and confidence
3. Tact, diplomacy in personal dealings with people
4. Enthusiasm, initiative
5. Poise, dignity, professionalism

VI. Professional Attitudes and Ethics

A. Professional ethics:
1. Ethical attitude toward cases and their families (avoids gossip, discusses cases only where and with whom it is appropriate to do so, keeps confidence of children and parents)
2. Ethical attitude toward principals, fellow teachers, and other school personnel (avoids discussing one teacher with another, or criticizing one school in another, etc.)

3. Ethical attitude toward colleagues in speech and hearing
4. Loyalty in supporting the policies of the school administration
5. Therapist's awareness of the responsibility assumed in undertaking any therapy with a human being (awareness of obligation to carry out therapy to the best of his knowledge and ability)
6. Therapist's willingness to put the responsibilities of his work ahead of his personal convenience; to regard his work with the seriousness it requires

B. Professional attitudes:

1. Respect for the worth of every individual
2. Regards speech correction as a 'career' rather than merely as a 'job'
3. Degree to which therapist is intellectually challenged by speech correction (manifests interest in research, interest in new speech correction techniques, interest in personal experimentation, etc.)
4. Generosity in use of own time and resources
5. Capacity for future professional growth
6. Evidence of current professional motivation and growth
   a. Attends conventions and local meetings when possible
   b. Reads new books and articles in speech and hearing, including Journal of Speech and Hearing Disorders
   c. Takes advanced training from time to time in speech, hearing, and related fields
7. Identification with the speech and hearing profession:
   a. Membership in the American Speech and Hearing Association
   b. Clinical certification in the ASHA
8. Breadth of view regarding education as a whole; awareness of educational trends and developments

Psycholinguistic Study Of Aphasia: A Revision Of The Concept Of Anomia

Joseph M. Wepman

R. Darrell Bock

Lyle V. Jones

Doris Van Pelt

As the first of a projected series of reports on the verbal language act, the present study concerns a psycholinguistic analysis of the residual speech in one type of aphasic disorder. This comparatively common type of aphasia has been variously labeled as 'anomia' (*3*), 'amnesic aphasia' (*1*), 'nominal aphasia' (*2*), or 'word-muteness' (*3*). Subjects suffering this disorder are often found to speak freely, yet their speech conveys little information because of their apparent inability to use substantive words. When such words are needed, they either omit them, substitute pronouns, or become circumlocutious in their attempt to communicate. Descriptions of this condition in the literature have been occupied almost exclusively with the evident loss of nouns. No attempt has been made to characterize more definitively the residual speech, to compare it with normal language, or to classify the words lost in terms other than grammatical function. In particular, no attention has been given to the relationship between the grammatical function of words and their frequency of occurrence in normal language. The present study attempts this type of analysis.

Since no reliable semantic count of spoken English is yet available, a normal model of the relationship between frequency and grammatical usage required for this analysis had to be constructed from word counts of written English. This model, based on the Lorge (7) magazine count and the Lorge and Lorge-Thorndike (*4*, *5*) semantic counts is presented in Table 1.

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TABLE 1. Normal Model: Expected number of occurrences per 10,000 words, according to grammatical function, of lexical units in groups of 100 ranked by frequency in normal written English.

Frequency Group	*Nouns*	*Verbs*	*Descriptive Modifiers†*	*Pronouns*	*Other*	*Total*
1	141	1007	250	1146	2995	5539
2	229	161	183	32	213	818
3	168	124	90	14	57	453
4	133	72	59	3	53	320
5	95	60	60	0	25	240
6	98	41	33	6	21	199
7	72	42	30	3	18	165
8	71	26	33	4	9	143
9	68	25	25	3	4	125
Balance*	1223	511	218	0	46	1998
Total	2298	2069	981	1211	3441	10000

*Entries in the 'Balance' row were estimated by sampling from the Thorndike-Lorge semantic count (5).

†Excludes numbers, determinatives, adjectives which also function as pronouns, and adjectives and adverbs which have largely syntactical function. Occurrences for these usages are combined with 'other.'

Table 1 was prepared as follows: The nine hundred lexical units[1] which occur most frequently in the English language, as determined from the Lorge magazine count, together with their observed frequency per 4.5 million running words, were entered on IBM cards—one unit per card. Since most of these lexical units were observed to function as more than one part of speech, it was necessary to estimate the proportion of their occurrences devoted to various parts of speech by reference to the Thorndike-Lorge semantic count and its summary in West's *General Service List of English Words* (*9*). These proportions for each lexical unit were determined and punched on the corresponding IBM card. The cards were then sorted in order according to the frequency of occurrence of the lexical units and divided into groups of 100. The lexical units in each group were assigned a group number— (*1*) for the 100 most frequent, (*2*) for the next 100 most frequent, *etc.* The observed frequencies of occurrence per 4.5 million words for each lexical unit were then divided among the parts of speech as indicated by the proportions obtained from the semantic count, and summed for each group. The resulting frequencies were divided by 450 so that they could be expressed as occurrences per 10,000 words.

For each of the frequency groups in Table 1, the proportions of occurences of the lexical units functioning as the various parts of speech were obtained by dividing entries in the rows of Table 1 by the corresponding row totals. The relations between proportions and frequency groups are shown graphically in Figure 1.

It is apparent from the relationship between grammatical function and frequency of occurrence shown in

[1]Words which are spelled the same, except for minor terminal inflections, are counted as the same lexical unit regardless of their meaning or grammatical function.

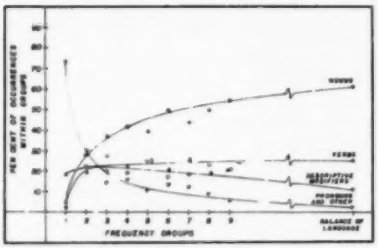

FIGURE 1. Relative frequencies of various parts of speech among lexical units ranked in groups of 100 by frequency.

Figure 1 that quite similar 'anomic-like' speech patterns might be produced in either of two ways. If words of lower frequency were suppressed from speech, the occurrence of nouns would be curtailed more severely than that of other parts of speech, and there would also be a concomitant over-use of higher frequency words. Conversely, if nouns were suppressed from speech, a compensatory over-use of high frequency words would again result, but lower frequency verbs, modifiers, pronouns and 'other' parts of speech would still be expected to occur.

The present study reports an attempt to test the adequacy of the classical definition of 'anomia' as a loss of substantive words by examining, in the residual speech of an anomic subject, the distribution of occurrences of words classified jointly by their frequency of occurrence and grammatical function in normal language. To determine whether the expected frequencies for normal written English, as given by Table 1, could reasonably represent spoken English, a sample of speech from a normal, non-aphasic subject was also analyzed and the results are presented for comparison.

The aphasic subject was a woman in her late forties, with high school education and secretarial training, who had suffered a cerebro-vascular accident in October 1954. At the time of her initial hospitalization, the day following the onset of the disorder, she was diagnosed as having suffered a 'stroke' without known cause. On ad-

TABLE 2. Aphasic Subject: Number of occurrences of words per 10,000, according to grammatical function and frequency in normal written English, of lexical units in the aphasic subject's speech.

Frequency Group	*Nouns*	*Verbs*	*Descriptive Modifiers*	*Pronouns*	*Other*	*Total*
1	147	1521	282	2833	2259	7041
2	68	141	522	143	531	1404
3	15	36	145	30	120	347
4	42	47	64	5	137	294
5	2	17	89	1	10	119
6	5	25	57	0	31	119
7	0	3	11	0	22	36
8	1	12	(24)*73	3	20	(60)*109
9	10	3	2	1	1	17
Balance	18	20	103	10	363	514
Tota	307	1824	1349	3026	3494	10000

*Figures in parentheses give frequencies for this group with occurrences of a heavily over-used adjective ('wonderful') removed.

TABLE 3. Normal Subject: Number of occurrences of words per 10,000, according to grammatical function and frequency in normal written English, of lexical units in the normal subject's speech.

Frequency Group	*Nouns*	*Verbs*	*Descriptive Modifiers*	*Pronouns*	*Other*	*Total*
1	151	745	246	2086	2854	6082
2	234	258	241	87	293	1113
3	164	122	102	18	132	538
4	87	62	60	3	74	286
5	81	67	56	0	22	226
6	57	42	44	1	47	191
7	60	21	48	2	23	154
8	51	27	19	10	4	111
9	27	17	16	5	0	65
Balance	492	155	346	16	225	1234
Total	1404	1516	1178	2228	3673	10000

mission she showed a 'right hemiplegia with homolateral facial involvement, positive right Hoffman, trace left ankle clonus with moderate right ankle clonus. Tendon reflexes were all active, speech inarticulate. Blood pressure was 140/105.' Two weeks later she was discharged from the hospital with the following description of her condition . . . 'Good general condition, agraphia and aphasia still severe with slight improvement; facial paralysis not apparent, reflexes almost equal with some hyper-reflexia of tendons of the right arm, no clonus, negative Babinski, Hoffman and Oppenheim signs. Feeds self well and walks well without aid of walker.'

The normal subject, a neighbor of the aphasic subject, was a forty-five year old woman with similar educational and occupational background.

Samples of 14,586 running words were obtained from the aphasic subject and 12,021 running words from the normal subject. Each sample was tape recorded in four weekly sessions and transcribed for analysis. Stimuli

TABLE 4. Aphasic Subject: Number of different words, according to grammatical function and frequency of the corresponding lexical unit, in 14,586 running words of the aphasic subject's speech.

Frequency Group	*Nouns*	*Verbs*	*Descriptive Modifiers*	*Pronouns and Other*
1	8	25	14	60
2	15	25	29	24
3	14	17	21	11
4	9	15	11	14
5	4	9	13	4
6	3	4	8	5
7	0	6	5	4
8	1	4	7	6
9	2	3	2	2
Balance	13	17	35	55
Total	69	125	145	185
Grand Total				529

TABLE 5. Normal Subject: Number of different words, according to grammatical function and frequency of the corresponding lexical unit, in 12,021 running words of the normal subject's speech.

Frequency Group	*Nouns*	*Verbs*	*Descriptive Modifiers*	*Pronouns and Other*
1	19	23	43	76
2	35	29	33	41
3	33	29	31	13
4	31	22	21	14
5	26	23	20	4
6	26	12	14	6
7	21	10	14	6
8	25	8	12	4
9	16	6	8	0
Balance	342	120	239	44
Total	574	282	435	208
Grand Total				1499

used to elicit conversation were the same for the two subjects. Each different *word* (not lexical unit) in each sample, with its part of speech and the number of times it functions as this part of speech in the sample, was entered on an IBM card. Each card was then punched with the group number of the corresponding lexical unit which had been determined in connection with the preparation of Table 1. This group number indicated that the lexical unit in which the word appeared in written English was in the first, second, . . . or ninth 100 most frequent lexical units, or in the balance of language. Cards for the two samples were sorted on this group number and for each group there were determined (1) the total frequency of appearance of words in the group, (2) the frequency according to grammatical function, and (3) the number of different words having a given grammatical function. Resulting frequencies, expressed as occurrences per 10,000 words, are shown in Tables 2 and 3, and counts of different words in each group for the two samples are shown in Tables 4 and 5.

In terms of the classical concept of anomia, it might be assumed that a reasonable approximation to the frequency distribution of the aphasic subject's speech could be obtained by removing the expected number of occurrences of nouns from the total frequencies for each group in normal language (Table 1) and prorating that number of pronouns over the groups according to the proportion of pronouns which each group already contains. But it is apparent from Table 1 that virtually all occurrences of pronouns fall in the first group, so it will suffice to enter all of the occurrences which would normally have been devoted to nouns into this group. The resulting distribution may be called an 'anomia model.'[2] The frequencies of occurrence of the lexical units in each group as observed in the speech of the normal and aphasic subject are shown in Figure 2 for comparison with the anomia model. Note that these frequencies are represented as a percent-

[2]An anomia model based on the noun and pronoun frequencies in the speech of the normal subject was essentially the same as the one shown in Figure 2.

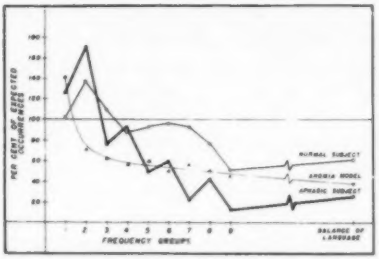

FIGURE 2. Comparison of the relative frequencies of occurrences of lexical units in the speech of the normal and aphasic subjects with those predicted by the anomia model.

age of the frequencies expected in normal written English as given by the row totals in Table 1. The percentages for the aphasic and normal subjects were obtained by dividing the row totals in Tables 2 and 3 by the corresponding row totals in Table 1.

For a sample of speech exactly comparable to normal written (magazine) English, we would expect the points in Figure 2 to cluster along the 100 per cent line. It is apparent that the speech of the normal subject did not meet this expectation, but showed instead an under-use of words of lower frequency and an over-use of words of higher frequency. This effect is undoubtedly a consequence of the more restrictive vocabulary of vernacular speech as opposed to writing, and of the circumscribed content of the sample in this study compared with the highly varied content of the sample in the Lorge magazine count.

The speech of the aphasic subject showed a similar but much greater under-use of lower frequency words and over-use of high frequency words. The effect appeared to be more severe than the anomia model predicted and suggested that all words of lower frequency were deficient in her speech. This conclusion was substantiated by the counts of the occurrences of lexical units in the two samples according to grammatical function. The frequencies of occurrence per 10,000 words of nouns, verbs, and descriptive modifiers in the aphasic and in the normal subjects' speech, again expressed as a percentage of the number expected in normal written English and obtained by dividing the entries in Tables 2 and 3 by the corresponding entries in Table 1, are shown in Figure 3.

Inspection of Figure 3 reveals:

1. The aphasic subject's speech was not entirely devoid of nouns, and those retained tended to occur among the most frequent lexical units. They were found to be highly general nouns ('thing,' 'people,' *etc.*) which are either used very much like pronouns in normal speech, or have a variety of meanings and frequently share the same lexical unit with a verb or adjective.

2. The aphasic subject's use of verbs was deficient in the lower fre-

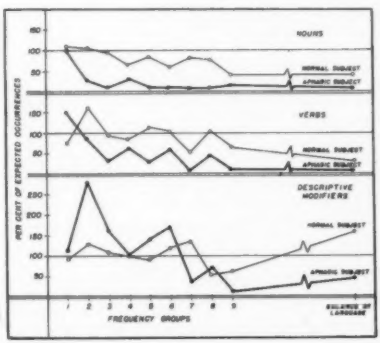

FIGURE 3. Relative frequencies of occurrences of nouns, verbs and descriptive modifiers in the speech of the normal and aphasic subjects.

quency groups and excessive in the highest frequency group. Apparently, she tended to omit lower frequency verbs and substitute highly general and frequent verbs such as 'is,' 'has,' 'do,' 'go,' 'like,' 'look,' *etc.* These verbs could be considered to have a functional relationship with respect to more specific verbs which is analogous to the relationship of pronouns to nouns.

3. The aphasic subject over-used descriptive modifiers in all but the lowest frequency groups and the balance of the language. Most of these occurrences were the result of her very frequent use of favored adjectives—'good,' 'wonderful,' 'nice,' *etc.* Indeed, her use of the word 'wonderful,' which is normally among the eighth hundred most frequent lexical units, was so excessive that the total occurrences for this group appeared unduly inflated. It seemed warranted, therefore, to list the frequencies for the eighth with the occurrences for this word omitted, and these reduced frequencies are shown in parentheses in Table 2. Figures 2 and 3 are constructed from these reduced frequencies.

Both the aphasic and normal subjects tended to over-use the 'other' words (not shown in Figure 3) in all but the highest frequency groups. This was largely the result of excessive use of contractions (which were classified as 'other') compared with written English—an effect which probably could be expected in all samples of spoken English. The aphasic subject's over-use of descriptive modifiers and 'other' words was not sufficient to bring the occurrences of lexical units in the lower frequency groups into the normal range (Figure 2), although her excessive use of a few favorite words tended to make her curve more irregular than that of the normal subject. As was expected, the use of pronouns by the aphasic subject was excessive in the higher frequency groups (Table 2). Note, however, that the use of pronouns by the nomal subject is also excessive compared to written English (Table 3).

While it is true that the loss of words from the aphasic subject's speech seemed more severe for nouns than for other parts of speech, two aspects of these results seem definitely contrary to the anomia concept. The first is that nouns *did* occur in her speech and were, on the whole, from among those extremely frequent in normal English. The second is that occurrences of verbs were excessive in highest frequency group and then showed losses which increased with decreasing frequency of the corresponding lexical units in normal language; similarly, the occurrences of descriptive modifiers, while excessive in most groups, were deficient in the very lowest frequency groups. In general, the same impression is given by number of *different* words retained in the aphasic subject's speech (Table 4) as compared with the normal subject's speech (Table 5). Although it is difficult to account for the number of different words that may be expected to occur in samples of speech of different size, the samples used in this study are sufficiently similar in size to justify the observation that verbs and descriptive modifiers, although not affected as much as the nouns, showed substantial losses in all but the highest frequency groups. It is also apparent that in groups in which the aphasic subject used modifiers more frequently than the normal subject, she retained fewer different modifiers but used them excessively.

These findings suggest that the concept of anomia, while characterizing the salient feature of the condition, obscures a more fundamental effect. We believe this effect relates to the generality of the words retained and, because highly general words have opportunities to occur in many contexts, relates to the frequency of their occurrence in normal language. It is evident in the transcript of the aphasic subject's speech that she has best retained single word sentences and series of short combinations of words which appear with great frequency in normal language. Her speech is made up of the conventional formulae of language into which a normal subject ordinarily substitutes a few specific words in the role of verbs or nouns, particularly nouns, to make them fully informative. A typical extract from the transcript of the aphasic subject is, for example:

> Yes! We . . . when I know. If I know what they're good, they're wonderful. I can, we have everything. Why don't I say what we have, because we have all the, that goes with . . . but, good, they're good. They're good to me.
>
> She's a good one; I like her. And then I had another one and she comes different on her time. Each one, and they're very good. oh, we've had them a long time anyway. They're wonderful; I love them. And they're always anxious to face what they're doing, if they have something to do or anything. And . . . I'd like to tell what they say. Why don't want to say that one? I know what she feels. Like she wants to, she wants me to know. I want to say 'em like say, but it must be, did she, no I know I know. All very funny, I almost would say it would come.

These words and word combinations appear to be 'over-learned' and virtually automatic in the aphasic subject's speech. Her use of them gives the appearance of an almost reflexive response to external stimuli or her own previous words. Like most subjects who exhibit this type of disorder, she appears to have little effective voluntary control over the individual words in these sequences. She generally cannot use them in isolation or in novel combinations.

It is of considerable interest that a type of aphasic disorder in which the statistical structure of the residual speech is precisely the converse of that of the anomic type is well known in the literature of aphasia. This is the disorder most often called 'expressive aphasia with agrammatism' (*6*). For example, a subject of this type whom we now have under observation shows unimpaired ability to use single words, with no apparent curtailment of words of lower frequency in normal English. She uses virtually no modifying or syntactical words but is able to communicate fairly well by stating in substantially correct order a few highly informative words relative to the meaning she wishes to convey.

Observations of these subjects and others with similar aphasic defects have led us to conceive of two continua of aphasic disorders on which many (although by no means all) types of aphasic speech impairment can be ranged. On the first continuum are the anomic-like aphasics, extending on the one extreme from subjects who retain only the most frequent phrases or serialized words to those on the other who have difficulty in finding only the infrequently used words in the language. The second continuum consists of the aphasics showing agrammatism. It ranges from patients who retain only the ability to name things when directly stimulated to

those able to speak spontaneously in reasonably complete sentences with occassional syntactical errors. We have conjectured that these continua reflect processes in normal speech which interact to place words in the flow of spoken language. One process is presumed to be a voluntary control of the entry of words which carry the essential information to the listener—the substance and action of the sentence. Disruption of this process leads to anomic-like speech which is deficient in lower frequency words. The other process is conceived of as largely automatic in function. With little conscious control on the part of the speaker, it serves to interpose between the more informative words the modifiers and syntactical words which qualify and give conventional form to sentences. Disruption of this process leads to agrammatic-like speech deficient in high frequency words.

We do not mean to suggest that the residual speech of aphasic subjects always shows an altered statistical structure in terms of word frequencies. We have, for example, extensive tape recordings of a subject who, as a result of a cerebro-vascular accident, has completely incoherent speech even though the frequency of use of words in his speech appear statistically normal. This subject seems to have retained all or most of his previous vocabulary, both in the voluntary and automatic spheres, but is unable to relate in a meaningful way to the stimuli received or to his own internal state which seeks verbal expression.

This disorder suggests a third process in language formulation, perhaps temporally prior to the other two, in which external and internal stimulation is transformed into a meaningful state before being translated into speech.

More will be said about all three of these processes in later communications. For the present, it can only be remarked that classical dichotomies of language into 'motor' and 'sensory' functions appear to overlook the dynamic transformation of stimuli into aroused meaningful states, the further transformation of these states into formative symbols, and finally, the interposing of syntax. It is here proposed that only by such a recognition of the interaction of meaningfulness, volitional selection, and automatic synthesis can the language processes be understood.

Summary

The adequacy of the concept of anomia as a description of a type of aphasic impairment was tested by comparing the speech of an anomic aphasic patient, and that of a normal subject with a normal model of speech. In particular, attention was given to the relationship between the grammatical function of words and their frequency of occurrence in normal language. It was found that some nouns do appear in the speech of the aphasic patient, but that these represent words extremely frequent in normal English. Further, it was discovered that all but the most frequent verbs and adjectives (in normal English language) tend to be absent from the speech of the aphasic patient.

On the basis of such evidence, it was hypothesized that anomia may be characterized by the loss of all but the most general (and hence most frequent) words in the language. It was conjectured that such a patient has suffered disruption of voluntary control of those relatively infrequent words which carry essential information to the listener, but has retained a

more or less automatic use of the highly frequent words which normally qualify more informative words. Implications of such hypotheses for other classes of aphasia were discussed.

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Relationship Between Lipreading Ability And Five Psychological Factors

John J. O'Neill

JoAnn L. Davidson

The person who has suffered a severe loss of hearing in most instances must depend upon educational rather than medical sources for rehabilitative help. The two most frequently used rehabilitative methods are those of auditory training and lipreading. The present study is concerned with the latter method.

Limited research effort has been directed toward a better understanding of lipreading. Hirsh (*2*) has said 'It is surprising that in spite of the long history of lipreading pedagogy, so little information has been accumulated experimentally concerning the personal, psychological or physiological factors that tend to produce good lipreaders.'

Those experimental studies that have been reported have dealt with the relationship between lipreading ability and intelligence, perceptual skills, educational achievement and personal adjustment. These studies have been discussed by Heider and Heider (*1*), O'Neill (*4*), and Pintner (*6*). The present study, which is an extension of the study of O'Neill (*4*), is an investigation of the relationship of five psychological factors to skill in lipreading among normal hearing individuals. These factors are (a) concept formation, (b) intelligence, (c) reading comprehension, (d) visual perception, and (e) level of aspiration.

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Procedure

Thirty undergraduate students served as experimental subjects. All had normal hearing and none had any previous lipreading training. The use of normal hearing subjects was based on the assumption that lipreading occurs in normal communication. O'Neill (*5*), in an experimental study, found that normal hearing individuals made appreciable use of lipreading in the comprehension of materials in isolation as well as in context.

A silent motion-picture test was used to ascertain the relative lipreading ability of the subjects.[1] The subjects were also administered the Hanfmann-Kasanin Concept Formation Test, the Rotter Level of Aspiration Test, the Similarities subtest from the Wechsler-Bellevue Adult Intelligence Test, and a perceptual span test. Also included were scores for intelligence level and reading comprehension.

[1]This film was a part of a series of films developed by Dr. Marie Mason.

These scores were obtained from the Ohio State Psychological Examination which is administered to all entering students.

Tests. The Hanfmann-Kasanin Test consists of 22 blocks of five different colors and four different shapes. The subject is required to sort the blocks into four categories. The test essentially samples concept formation (non-verbal) in terms of a problem solving setting (7).

The Similarities subtest of the Wechsler-Bellevue Adult Intelligence Test is one of 11 subtests. It consists of 12 pairs of nouns. The subject is to explain in what way the pairs are similar. It is, essentially, a test of verbal concept formation (*11*).

Visual perceptual skill was tested by means of the projection of 33 slides containing from four to eight digits. The slides were projected by means of a tachistoscope at an exposure rate of one-tenth of a second.

Rotter Level of Aspiration Test utilizes the Rotter Level of Aspiration Board and is a motor performance type of test. The subject makes prediction as to future performance on the test on the basis of previous performance. This provides a means of studying the effects of success and failure on the explicitly set goals of an individual (*8*).

TABLE 1. Correlation (*rho*) between lipreading and comparison tests (N = 30).

Comparison Tests	*rho*
Similarities subtest	.03
Hanfmann-Kasanin Test	.39*
Intelligence Test	.03
Reading Comprehension Test	−.03

*Significant at the 5% level of confidence.

Results and Discussion

The subjects were ranked in keeping with their scores on the lipreading criterion test and three of the comparison tests, tests of concept formation, intelligence, and reading comprehension tests. Correlations between rankings (*rho*) were then computed.

Concept Formation. The correlation between the results of the Hanfmann-Kasanin Test and the relative level of lipreading ability was significant at the five per cent level of confidence (see Table 1). The correlation coefficient for the Similarities subtest was non-significant. This apparent contradiction between the two tests of concept formation may be due to the fact that one test measures verbal conceptualization, the other non-verbal conceptualization. This would appear to indicate that skill in lipreading involves not the recognition of verbal elements but configurations or form patterns. It is also of interest to note that the better lipreaders required less time than the poorer lipreaders to complete the sortings on the Hanfmann-Kasanin Test (10.6 minutes *vs.* 15.9 minutes).

Intelligence and Reading Comprehension. As is evident from Table 1, there was no significant relationship between lipreading ability and intelligence or reading comprehension. The rank order correlation for intelligence is much lower than that obtained in previous studies. This may have been due, in part, to differences in the types of tests employed and the educational backgrounds of the subjects. The negative correlation obtained for reading comprehension is somewhat similar to that obtained by O'Neill (*4*). Apparently the skill utilized in the comprehension of printed

TABLE 2. Summary of analysis of variance testing differences among digit span scores and lipreading scores.*

Source of Variation	*df*	*ss*	*Variance*	*F*
Groupings	2	.23	.115	.168
Subjects	27	18.47	.684	
Total	29	18.70		

*Due to unequal size of subsamples, a modification of a single classification analysis of variance was employed. Such a method is discussed by McNemar (3).

materials is not the same as that employed in the recognition of oral symbols.

Visual Memory Span. The mean digit span for the 30 subjects was 4.9 digits. The mean score for the better lipreaders was 5.1 digits and for the poorer lipreaders, 4.9 digits. The data were put to statistical test by means of a single classification analysis of variance. The sources of variation were *subjects* and *groupings* (good or poor lipreaders). The resulting F-ratio was non-significant (see Table 2). Thus it may be assumed that visual memory span is not a major factor in success in lipreading. These results, however, do not necessarily imply that visual training is not a useful adjunct to lipreading training. In fact, in light of the findings for concept formation, it might be well to give training in the recognition of configurations (simple form or pattern recognition).

Level of Aspiration. This test was employed because of implications by lipreading instructors that the pupil's basic behavior in relation to success or failure in lipreading plays a major part in his ability to learn to lipread. The scores from the Rotter test were grouped on the basis of *good* and *bad* responses (*8*). The frequency of occurrence of these responses in relation to good and poor performance on the lipreading test were statistically evaluated. The resulting chi-square of 1.22 was non-significant. A further qualitative analysis of the obtained *difference scores* (the difference between estimated and obtained scores) indicated that there was no significant pattern of scores that could be associated with success in lipreading. Thus, it would appear that there was no significant difference in level of aspiration behavior between good and poor lipreaders. It might be postulated, however, that if such a measure was made periodically during the viewing of several lipreading films, a greater spread of scores might be obtained, *i.e.*, the subjects would have more definite success and failure reactions.

Conclusions

Within the limits of this study the following conclusions can be made relative to the relationship of certain psychological factors to skill in lipreading:

1. There is no statistically significant relationship between lipreading ability and level of aspiration, intelligence, reading comprehension, or digit memory span.

2. There is a statistically significant relationship between lipreading ability and non-verbal concept formation.

In light of the latter finding, it may be well to include training in the recognition of simple forms or lip configurations along with training in a regular method of lipreading.

Summary

Thirty normal hearing subjects were administered a filmed lipreading test as well as four other tests. These were

the Hanfmann-Kasanin Concept Formation Test, the Rotter Level of Aspiration Test, the Similarities subtest from the Wechsler-Bellevue Adult Intelligence Test, and a perceptual span test. The subjects were also ranked in terms of their scores on the lipreading criterion test and scores on intelligence and reading comprehension tests. Statistical evaluation of the data indicated that there was no significant relationship between lipreading ability and level of aspiration, intelligence, reading comprehension, or digit memory span. However, there was a significant relationship between lipreading ability and non-verbal concept formation.

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Teacher Judgment Of Hearing Loss In Children

Margaret L. Geyer

Alfred Yankauer

In many school systems in the United States, the ideal of testing the hearing of each child every year or even every two years cannot be approached (*5*, *7*). Compromises must necessarily be made while maintaining the highest possible case-finding efficiency. Such compromises are often achieved at the expense of children below the third grade level since younger children require more time to test. This has been the case in Rochester, New York (elementary school population 42,000). Children below third grade have been tested only if referred by teachers, whereas children from grades three to seven have been tested biennially.

Several studies reporting the inaccuracies of teacher-judgments of hearing loss have been made. Most recently, Curry (*2*, *3*) concluded that 'the identification of hard of hearing children should be done by audiometric examination and not by a system of teacher referrals.' However, his study, as well as previous studies, leave certain questions unanswered. How does the accuracy of teacher referrals relate to hearing loss for speech frequencies only, to different degrees of loss, to the proficiencies of different teachers and the size of their classes, to the specificity of observed signs and symptoms, and to educational and medical recommendations made for the children? The present study was undertaken to find answers to these questions.

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Procedure

Seven elementary schools of varying socio-economic background were selected for study. A form used by the teachers in previous years for listing their referrals was revised and given to every first and second grade teacher in the seven schools. The teacher was requested to list the name of each child in her grade and to give her opinion of each child's hearing. If she questioned a child's hearing, she was requested to specify the reason or reasons, using the following check-list code.

A. Physical Signs
   1. Ear discharge
   2. Cotton in ear
   3. Tired, strained expression long before day is over

TABLE 1. Incidence of hearing loss according to prior teacher judgment of hearing loss.

Teacher Judgment	*Total Examined*		*Hearing Loss Found*		*Hearing Loss Not Found*	
	Number	*Percent*	*Number*	*Percent*	*Number*	*Percent*
Hearing loss suspected	256	24.3	31	38.3	225	23.1
Hearing loss not suspected	797	75.7	50	61.7	747	76.9
Total	1,053	100	81	100	972	100

4. Mouth breather
5. Watches lip movements very intently

B. Behavior
1. Is inattentive
2. Cocks head toward speaker
3. Fails to carry out spoken directions
4. Asks to have words or questions repeated
5. Lacks clear or distinct speech
6. Has abnormality of voice
7. Is shy and withdraws from group
8. Fails to volunteer in class

C. Complaints
1. Has earache
2. Has buzzing or ringing in ears
3. Has stuffy feeling in ears
4. Hears noises in head

Teachers gave their judgment on the hearing of 1197 children in their grades. One hundred and forty-four children who later were absent for the screening and/or threshold test were eliminated. The number remaining, 1053, was the number considered in this study.

An individual pure tone sweep check test was subsequently given to each of the 1053 children. A Maico F-1 audiometer was used. Each child was screened on five frequencies: 500, 1000, 2000, 4000 and 6000 cps (*4, 6*). The attenuator was set at 20 db. If a child failed to hear any one frequency in either ear he was screened out and later given an individual threshold test. These latter tests were given on a Western Electric 6BP audiometer. Six frequencies were used: 256, 512, 1024, 2048, 4096 and 6144 cps. The criterion for determining hearing loss on the threshold test was a 20 db. loss for any two frequencies, or a 25 db. loss for any one frequency, in either or both ears.

All children found to have a hearing loss by these criteria were examined by an otologist.[1] Medical recommendations were made on the basis of inspection of the nasal passage, pharynx and tympanic membrane. Nasopharyngoscopy was not performed. Educational recommendations were made jointly by the otologist and audiologist.

Results

Eighty-one of the 1053 children screened (7.7%) were found to have a hearing loss as defined above (see Table 1). Medical or educational recommendations were made for all but 8 of the 81 children. Twenty-four percent of the 1053 children were suspected of hearing loss by teachers.

[1]Dr. Lawrence J. Nacey, now retired, was Consultant Otolaryngologist, Rochester General and St. Mary's Hospitals in Rochester, New York.

TABLE 2. Average db loss in speech range of 81 children with hearing loss by type of loss and teacher judgment of loss.

Average db Loss in Speech Range (512, 1024, 2048 cps.)	*Unilateral Loss*		*Bilateral Loss**	
	Teacher Selected	*Not Teacher Selected*	*Teacher Selected*	*Not Teacher Selected*
5 or under	3	6	1	3
6–10	1	4	2	2
11–15	6	8	3	4
16–20	3	6	1	3
21–25	6	5	1	0
26–30	2	2	0	0
31–35	1	4	0	0
36 and over	0	3	1	0
Total	22	38	9	12

*Better ear average computed by averaging the better score for each of the three speech frequencies.

Of the 81 children with loss, 62% were unsuspected by teachers, so that if reliance had been placed upon teacher selection three out of five children would have been overlooked. On the other hand, teacher 'suspicion' increased the likelihood of finding hearing loss. Twelve percent of the 256 'suspected' children had a hearing loss as compared to only 6% of the 797 'unsuspected' children.

The audiograms of the 31 children suspected of hearing loss by teachers were compared with those of the 50 children whose loss was unsuspected. In this analysis only the three speech frequencies were considered: 512, 1024, and 2048 cps. For audiograms showing unilateral loss, the decibel levels at these three frequencies were averaged showing the loss of the poorer ear. In cases of bilateral loss, the better ear average was determined by selecting the lower threshold for each of the three speech frequencies and averaging them. The results of this analysis are shown in Table 2. Only two children can be said to have had a moderate bilateral loss at the speech frequencies and both of these were suspected by the teacher. However, in the case of unilateral loss even severe degrees of loss were not suspected.

TABLE 3. Teacher judgment of hearing loss for 81 children found on examination to have hearing loss, according to results of examination at speech frequencies.

Teacher Judgment of Hearing	*Results of Examination at Speech Frequencies*			
	Passed		*Failed**	
	Number	*Percent*	*Number*	*Percent*
Suspected of loss	13	38	18	38
Not suspected of loss	21	62	29	62
Total	34	100	47	100

*20 db. or more loss at two or 25 db or more loss at one of the three speech frequencies: (512, 1024, 2048 cps.).

A second analysis of audiogram findings in the speech range was made in an attempt to see if teachers were more likely to select children with speech range losses than children with losses at high frequencies (see Table 3). In this analysis, children were considered to have 'failed' at speech range frequencies (512, 1024, 2048 cps.) if there were losses of 20 db or more at two speech frequencies or 25 db or more at one of the three speech frequencies. This analysis showed no relationship between teacher-judgment and failure at speech frequencies even in the case of children with bilateral losses (using same criterion for both ears).

Further analyses were made of the children with hearing losses both at all frequencies tested and at the three speech frequencies in attempts to relate the efficacy of teacher case-finding to sex of child, to individual teachers (analysis by schools), to size of class, and to specific symptoms and signs on the check-list. None of these analyses disclosed any significant relationships.

These results confirm those of previous studies. Teacher-judgments cannot be relied upon as a method of selecting children with a hearing loss. In this study, teachers overlooked 62% of the children found to have a loss, whereas 88% of the children they 'suspected' of loss had normal hearing.

Only two children were found with appreciable bilateral loss and both of these children were suspected of loss by their teachers. In the 'teacher-suspected' group, the incidence of hearing loss was twice as great as in the group not suspected of loss by teachers. This latter finding is somewhat puzzling since the teacher-selected group had no higher proportion of children with speech-range loss and no special symptoms or signs that distinguished them from the unsuspected group.

Conceivably, if facilities were available to screen only one-quarter of the younger children, there is some advantage in screening the quarter selected by teachers rather than a random quarter. It seems highly unlikely that this point is of any practical importance, however. If a program is already committed to screening one quarter of a given class, the extra effort required to screen the remaining three-quarters is relatively slight.

Summary

Teacher-judgments of hearing loss based upon a check list of symptoms and signs were obtained on 1,053 first and second grade children in seven schools. All children were screened for hearing loss by individual pure-tone sweep check testing. Children failing this screening test were threshold tested and seen by an otologist. Teachers 'over-suspected' children to an appreciable extent and failed to suspect 62% of the children with a hearing loss. However, the incidence of hearing loss was twice as great in the 'teacher-suspected' group as in the 'unsuspected' group. No significant relationships were found between the effectiveness of teacher selection and hearing loss at speech frequencies (except when moderately severe), sex of child, size of class, nature of symptoms or signs, or individual teachers and schools.

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Testing The Hearing Of The Mentally Retarded

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Unless the impairment is severe, hearing losses frequently are unrecognized among the multiple-handicaps found in a retarded population. Estimating the retarded child's hearing loss by audiometric and other techniques may be difficult. Other disorders can obscure the diagnosis. Personality disturbances, dysphasias, and other sequelae of cerebral damage prevalent among retarded children confuse estimates of their auditory acuity. Careful differential diagnosis usually will separate those with peripheral hearing losses from those with psychic deafness, dysphasias or other pathologies, although overlapping may occur.

Recent articles have reported results of audiometric testing of mentally retarded children. The percentage of hearing losses runs high. Reports in which 200 or more retarded children were tested give percentages of hearing loss varying from 13 per cent to 55.5 per cent (*2, 5, 6*). Significant hearing losses were found by Schlanger in 30 per cent of 74 retarded children (*7*) and 32 per cent of 118 children (*8*). However, these results are only roughly comparable as the range of frequencies tested varied, populations were diversified in terms of C.A. and M.A., and the criteria for judging the significance of the hearing losses differed. Nevertheless, it is pertinent to point out that independent studies have found from two and a half to ten times more children with hearing deficiencies among the mentally retarded than is found in normal school populations in which an estimated five per cent have auditory losses (*4*).

This is a report of measures employed by The Training School at Vineland, N. J. in testing the hearing of mentally retarded children. It also describes procedures used in aiding children with hearing handicaps.

Subjects

The 498 subjects tested were residents of The Training School. The mean chronological age was 28.9 years $\pm$ 17.3. The mean mental age was 7.8 years $\mp$ 3.0. (This is a rough approximation since the M.A.'s were computed on the basis of several tests). A division of the total population was made at a C.A. of 20 years in order to separate to a certain extent the effects of advancing age on hearing acuity. It has been pointed out that from a C.A.

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of 20 years the incidence of hearing loss increases markedly and continues to rise in direct relationship to age (*1*). There were 210 subjects below C.A. 20 years. The mean C.A. of this group was 13.9 years ± 3.6. The older group consisted of 288 subjects whose mean C.A. was 39.6 years ± 15.0.

Procedure

In the hearing testing program at The Training School, each child received an audiometric test upon admission and yearly thereafter. The complete range of frequencies of the ADC model P-60-A audiometer was used. Test frequencies were in ten

TABLE 1. Hearing classification based on air and bone audiometric testing.

Class	Description	Recommendation
I	Normal. Readings for all frequencies at 15 db or less. May include one reading above 15 db in one or both ears outside speech frequency range.	None.
II	Slight loss. Tests at 20-30 db for two or more frequencies in one or both ears outside speech frequency range.	Biannual diagnostic rechecks and hospital referral.
III	Moderately severe loss in one or both ears but hearing aid prescription not warranted as residual hearing is adequate for communication.	Hospital check for possible pathology. Refer to otologist for recommendations.
.1*	Conductive loss. 30 db or more for frequencies 125, 250, 500, 1000 cps in air conduction test. Bone conduction results usually give improved readings.	
.2*	Perceptive loss. 30 db or more from 2000 to 12000 cps and including frequencies 3000, 4000, 6000 and 8000 cps, air conduction. Approximately same bone conduction readings at 2000, 3000, 4000 cps.	
.12	Mixed loss. Both low and high frequencies depressed. Any combination of .1 or .2. However, one ear is sufficiently intact for speech reception.	
IV	Hard of hearing. Losses in both ears greater than 30 db but with residual hearing. Interferes with the hearing of speech.	Otological referral by hospital. Program to preserve residual hearing. Use of hearing aid if feasible.
V	Deaf in one or both ears. No response in affected ear(s) at any frequency at maximum output of audiometer.	Depends on whether there is residual hearing in one ear. Otological exam for medication or operation. Hearing aid considered if there is sufficient residual hearing in one ear.
VI	Invalid responses to audiometric testing—'non-testable.'	Subjective judgment based on overt responses to noise, music, conversation.

*Followed by R or L designates impaired ear in any Class III sub-group. Without these appended symbols, it is indicated that both ears are impaired.

TABLE 2. Results of an audiometric survey of 498 mentally retarded subjects.

Hearing Classification	*C. A. 5–20 yrs.*	*%*	*C.A. over 20 yrs.*	*%*	*Total*	*Total %*
I (Normal)	108	51.4	65	22.6	173	34.7
II (Slight Deviation)	26	12.4	44	15.3	70	14.1
III						
.1 L or R (Conductive)	9	5.2	9	4.5	18	4.8
.1	2		4		6	
.2 L or R (Perceptive)	16	17.1	8	27.2	24	22.9
.2	6		43		49	
.12 L or R (Mixed)	11		3		14	
.12	3		24		27	
IV (Hard of Hearing)	6	2.9	24	8.3	30	6.0
V (Deaf)	1	0.5	4	1.4	5	1.0
VI (Non-Testable)	22	10.5	60	20.8	82	16.5
Total	210		288		498	

steps, 125, 250, 500, 1000, 2000, 3000, 4000, 6000, 8000, and 12000 cps. The frequencies important to speech, 500 to 4000 cps, were tested first in each ear, beginning with 1000 and proceeding to 4000 cps. Returning to 1000 cps, this frequency was rechecked and followed by 500 cps. After both ears had been checked individually, frequencies 6000, 8000, and 12000 cps were tested in that order followed by 250 and 125 cps.

Some modifications from the usual audiometric techniques were instituted. A longer training period usually occurred so that hand signal responses to tone were learned. Intensity levels of 50 db were fed into each ear at three frequencies, 250, 1000, and 3000 cps, so that the subject knew for what he was listening. In the event that no response was obtained, db levels were raised. This whole training period, brief in some instances, was used as a warm-up period in which fears were allayed and motivation attempted. When this conditioned response technique did not work, the 'ear-choice' technique (*3*) was used. The subject responded by pointing to the ear in which the sound was heard. Where a conductive loss was indicated, verification was sought by use of bone conduction stimuli. The bone frequencies used were 125, 250, 500, 1000, 2000, 3000, and 4000 cps. Standard bone audiometric techniques, including masking tone, were employed.

A hearing classification system was used (see Table 1) which broadly described the audiometric results and recommendations. Hearing loss classifications could be expanded to include every possible variety of hearing impairment. However, experience has shown that this type of classification has been most practical for The Training School program.

Results

Table 2 gives the results of the audiometric survey. The percentages of those having losses in each classification are indicated. The test findings for the entire population as well as

the two segments of the population divided at C.A. 20 years are given.

Thirty-five per cent of the total population fell into the Class I category. A more complete picture of the number with normal hearing acuity for speech is obtained by adding Class II (14 per cent) to Class I (35 per cent). This indicates that 49 per cent of The Training School population had hearing within normal limits for the speech frequencies. A final statistic is not possible in terms of the percentage with normal hearing as Class VI, the 'non-testables' (17 per cent), probably contained many who possessed normal auditory acuity. Granting this assumption, one could say that over half of The Training School population had normal speech hearing. Thirty-five per cent (Classes III, IV and V) had demonstrable hearing losses which were significant and indicated a need for conservation or remediable measures.

The 288 subjects in the group whose C.A. was over 20 years demonstrated greater hearing impairment than the 210 subjects under 20 years. Sixty-four per cent of the younger group were in Classes I and II as compared to 38 per cent of the older subjects. Another finding was that 78 (27 per cent) of the older subjects exhibited III.2 and III.12 losses as compared to 36 (17 per cent) of the younger group.

The children in the Class VI group were, for the most part, the lower grade children. Three out of four of the 'non-testables' had mental ages below five years. However, 27 other children with mental ages below five years responded validly to the audiometric test and were classifiable. A rough estimate indicated that one out of three retarded children in this survey below a mental age of five years could be tested audiometrically.

Class VI was reduced considerably by the use of the 'ear choice' technique. Many who would not respond validly to the conditioning usually attempted in pure-tone testing, responded well to this technique.

Among the 'non-testables', 51 of the 82 children had personality ratings demonstrating disturbances ranging from poor adjustment and neuroses through various psychotic behavior patterns. Further, more than four out of five had social quotients below 40. The etiological breakdown of primary causation of mental retardation revealed that 45 of the 'non-testables' had a central nervous system impairment and 21 were mongoloid; the remaining 16 were of unknown etiology or in other categories.

Recommendations

If a child's hearing was Class III, IV, or V (and sometimes VI), he was referred to The Training School Hospital for examination. From there, the subject was scheduled for examination by an otologist. If pathology was found, a medical treatment program was instituted. If medical treatment was recommended, the hearing aid was not fitted until such treatment had been completed. Subjects still in need of amplification were given a trial period with an aid. Usually the aid was tried with subjects who demonstrated a loss in the better ear of 30 db or more in the speech frequencies.

A demonstrable loss of hearing in the retarded child was just one of the factors involved in the selection of cases for hearing aid trial. Personal responsibility and adjustment also were important. Careful weighing of these factors was necessary in order to gain an accurate prognosis for hearing aid therapy. After considering the

initial observations and reports, a trial period was instituted. During this trial the subject was introduced to amplified sound gradually, and a strong positive attitude toward the hearing aid was developed. In qualified cases speech reading instruction was given as a supplementary means to effective communication. Where needed, speech correction was instituted.

At the conclusion of the initial training period of two months with the aid, the individual's responses were evaluated. If he demonstrated a lack of responsibility for, or benefit from the aid, a further training period was then given. In subjects with unfavorable prognoses based on trial therapy, the use of the aid was discontinued. However, if cases were orginally prognosed carefully, the latter course was not necessary.

The following are two illustrations of boys who benefited through the use of hearing aids:

When Billy came to The Training School at C.A. 11 years, he obtained a WISC Performance I.Q. of 54. He had no speech other than jargon. He was a behavior problem with many aggressive reactions. The psychological diagnosis was: mentally deficient, moron level; etiology, congenital cerebral defect caused by measles during pregnancy. The hearing diagnosis was Class IV, mixed type hearing loss with all frequencies depressed severely, and aphasic-like symptomatology. Training with a hearing aid was instituted along with a combined audio-visuo-kinaesthetic approach to language and speech. Response to the aid was variable and erratic. In time he learned that the aid was a benefit to him in working and playing with his classmates. At present, he is using the aid at all times in the clinic and classroom. His behavior problems have been largely alleviated. He can now use phrases and short sentences, though sentence development is still highly unstable. His WISC Performance I.Q., 87, places him at the borderline level of intelligence. His VSMS social quotient is 78 in spite of handicaps. Within another year Billy should be responsible enough to wear the aid to his cottage evenings and weekends. Though the aphasic problems still remain, hearing aid benefits have produced a more favorable prognosis for speech therapy and language development.

George, 10 years old at entrance, had a Binet I.Q. of 65; etiology, trauma during birth; well-adjusted personality. Audiometric testing indicated serious binaural hearing losses for high frequencies as well as moderate losses in low frequencies, Class IV. His speech was severely dyslalic. He has been wearing a hearing aid for one and one-half years. Though he was adept at speech reading, classwork suffered as he missed discussion and oral communication with fellow students. At present, his speech still contains some sound distortions though it is readily intelligible. He wears the aid at all times and has assumed complete responsibility for it. His improved reactions with the aid have been one of the factors which eventually will enable him to return to his community as a useful citizen. Steady gains have been observed in I.Q. scores. Now 15, he functions at the dull normal level with a WISC full scale I.Q. of 79; the performance I.Q. is 95, and the verbal is 67. The VSMS social quotient is 106.

In addition to these two boys, five others were wearing aids. Four wore them on a full-time basis, and one wore his in class only. Three others with a favorable prognosis for hearing aid use were to begin trial periods in the near future. Most subjects with a C.A. above 20 years, who had been selected as qualified, adapted well to the mechanical aspects of the aid. After learning to maintain and adjust the aid to their needs, they reported to the clinic weekly for equipment and repairs. As a rule, these cases were at the moron level, demonstrated good adjustment, and had acquired hearing losses after speech emerged.

Conclusions

Hearing difficulties which are prevalent in a large proportion of mentally retarded populations may go undetected because of other more prominent abnormalities. Hearing losses, when they occur, should be considered as contributing in some measure to educational and social retardation, particularly among higher grade retarded children. While the mental retardate may be functionally unaware of the finer differentiations between sounds, most are capable of responding validly to pure-tone audiometric testing. Hearing losses are not 'caused' by mental retardation but may stem either from the same pathology of which mental retardation is a symptom, or the two conditions may be wholly unrelated etiologically.

Difficulties in testing the hearing of the mental retardate were experienced among the low-grade or very young, slow developing subject. The former usually included those with neuropsychiatric disorders; the latter probably did not realize the significance of the test sufficiently to offer a valid response. In this instance, they appeared to function on the level of younger normal children. In such cases, psycho-galvanic testing may have offered valid results. However, there was a high incidence of cerebral insult in this group of young retardates which might have affected PGSR audiometry results.

It may be concluded from this study that in the routine examination of all retarded children, hearing testing should be included. The psychologist attempting tests which rely heavily on verbal methods that penalize the child with a hearing problem, needs information concerning the child's ability to hear. The educator could utilize the information of a child's hearing loss and adapt teaching methods which would enable the child to achieve his potential.

Summary

Pure-tone audiometric tests were administered to 498 mentally retarded subjects at The Training School at Vineland, N. J. The subjects were classified according to the severity of their hearing impairments. Test results indicated that approximately 35 per cent had normal hearing, 14 per cent had only slight deviations at extreme frequencies (essentially normal), 28 per cent had moderate losses, six per cent were hard of hearing and one per cent deaf. Subjects with a C.A. over 20 years demonstrated greater hearing impairment, particularly in the high frequency area, than those under 20. Seventeen per cent of the population were 'non-testable'. These children usually were below a mental age of five years, had personality disturbances of varying degrees, and had social quotients below 40. Four-fifths of this group were either of organic or mongoloid etiology. Recommendations included hospital referral, otological examination and treatment, hearing aid amplification whenever feasible, speech reading, and speech correction.

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Book Reviews

JOHNSON, WENDELL. *Your Most Enchanted Listener.* New York: Harper and Brothers, 1956. Pp. 215. $2.25.

What goes on in the communicator and what goes on in his communicatee is described in this fascinating book. *Your Most Enchanted Listener* refers to yourself. In a non-technical treatment, which verges on the poetic at times, the author has explained some very technical matters from the areas of information theory and general semantics which teachers, therapists, parents, and students of communication, language and speech disorders will find very important.

Dr. Johnson describes some of the behaviors whereby information is processed through the human nervous system. He deals with some of the pitfalls and hazards to thinking straight about our own idiosyncrasies, our tendencies to self-generate our own befuddlements and self-confirm our own errors.

The series of communication behaviors between two persons which Dr. Johnson originally outlined in the *Quarterly Journal of Speech* (Vol. 32, December, 1951) is further explained in this volume. This five-stage process begins with an event which stimulates the sense organs. The resulting nerve impulses travel through the brain into pre-verbalizing, verbalizing, and utterance. At this point the process is repeated in the auditor, who responds with feedback to the speaker's message. In this circuit both the speaker and the listener must give a certain amount of listening to what is going on within themselves. This enables them to avoid impulsiveness and stupidity; it enables them to maintain better self-control and a more scientific attitude in their around-the-clock relationships.

Toward the achievement of two-way communication the most important chapter to this reviewer is that entitled 'The Ordeal of Asking Questions'. If we would help a stutterer, or build a bridge, or catch a mouse, we have need of dependable observations, and we must ask the questions that direct us to them. 'A staggering price is demanded: In order to ask questions that might bring better answers than those we already have we must be prepared to cast aside the answers we have, the very answers indeed we have learned to trust because they are given to us by our parents and our moral exemplars and our teachers.' (p. 46) 'Most difficult and essential of all is the questioning of humanity's failure to question. What we take for granted is especially to be re-examined with the uncompromising honesty of scientific inquiry. For it is in precisely these regions of our thinking which we—which people everywhere have most stoutly protested from rigorous investigation, where we have insisted that science does not apply, that we seem most likely to discover our delusions and the sources of our conflicts.' (p. 47)

This book is in many respects a further development of the author's *People in Quandaries* (Harper and Brothers, New York, 1945). From the general semantics of Alfred Korzybski he has further applied such ideas as self-reflexiveness and abstracting. There is an application of the ideas of multicausality and correlation, of form and function, and other factors of logic which operate unconsciously within us. By way of a living awareness of these and other matters, 'and a sensitivity to the wondrous transition from silence into symbol, we may come upon our hope of freedom from the Truth that distracts us from the truths there are to know'. (p. 178)

ELWOOD MURRAY
University of Denver

HEJNA, ROBERT F. *Your Child's Speech: A Handbook for Parents.* Wisconsin: College Typing Co., 1955. Pp. 46. 75¢.

The first half of this pamphlet contains a well-simplified discussion of the development of speech presented in informal terms

Book Reviews is edited by Ernest H. Henrikson, University of Minnesota.

and without rigid interpretation of chronological age levels. Suggestions for application of the 'indirect method' of stimulating speech development are included.

Delayed speech, articulatory problems, stuttering, cleft palate, and cerebral palsy are defined concisely and simply in the second half. Unfortunately, the possibility of a hearing loss concomitant was omitted from the discussion, although emphasis is placed upon the necessity for adequate medical evaluation. Socio-psychological aspects are discussed clearly and carefully. Initiation of home therapy is encouraged with specific examples. A large number of speech clinics are listed, according to state, in the appendix.

When speech consultation is not available, this pamphlet might be used to define the speech defect for the parent and to prevent additional problems arising from familial pressure. Also, it might be of value in conjunction with clinical evaluation and interpretation especially where therapy is on an intermittent basis.

HARRIET G. KOPP
Rehabilitation Institute of Metropolitan Detroit

MEEHL, PAUL E. *Clinical versus Statistical Prediction.* Minnesota: University of Minnesota Press, 1954. Pp. 136. $3.00.

Unless the role of the clinician in fields such as speech pathology, clinical audiology, clinical psychology, etc., is one of blind irrationality, it involves making almost continuous predictions concerning some aspect of behavior. One measure of progress is the extent to which methods are developed for improving the accuracy with which it is possible to make such predictions. In all of these clinical fields an important objective of researchers has been the development of tools and techniques for measuring aspects of behavior thought to be relevant to the problems under consideration. The application of such standardized measuring procedures, along with norms for their interpretation, means that, in some degree, statistical prediction procedures are substituted for clinical judgment or insight.

Although most clinical workers are undoubtedly in sympathy with the goal of improving clinical prediction, there have been many who have had serious doubts concerning the shrinking role of clinical judgment and its replacement by actuarial (statistical) predictions. They have argued that the individual is much more than a number, or set of numbers, to be interpreted by reference to group averages or norms, that there are innumerable variations in individual behavior that cannot be taken into account by standardized testing procedures or by inserting test scores into regression equations. Some of these people see the movement toward more widespread use of statistical prediction as an encroachment of inferior, inflexible, mechanistic methods into a realm of evaluation and prediction which requires the art of a skilled and sensitive clinician possessing special gifts of judgment and clinical insight.

These issues are certainly significant for all students and professional workers who seek to understand and deal with problems of individual human behavior. This book, which addresses itself directly to these issues, should therefore not only be required reading for all students and professional workers in such areas, but should be read with avid interest and thoughtful consideration.

The book, though brief in number of pages, is comprehensive in its coverage, both of theoretical points of view and of the empirical results of research studies. It is essentially eclectic in recognizing the validity of arguments on both sides. It represents a very thoughtful and thorough consideration of the issues by a man who is well qualified to discuss them, both as a clinician and as one who understands statistical prediction. It may disappoint some who are looking for simple answers to these very complex questions, or who are seeking merely to find support for their own biases. This reviewer believes, however, that most professional workers will find the reading of this book a stimulating and worth-while experience. For the student who wishes to pursue the subject more intensively, the bibliography of one hundred and four items should prove extremely helpful.

JAMES F. CURTIS
State University of Iowa

STEVENS, S. S., LORING, G. J. C., and COHEN, DOROTHY. *Bibliography on Hearing.* Massachusetts: Harvard University Press, 1955. Pp. 599. $7.00.

This volume, completed through a contract of the Office of Naval Research, is an enlargement of *A Bibliography in Audition*

previously compiled by Miller, Galambos, Rosenblith and Hirsh, published in 1950. According to the authors, 'This edition, the *Bibliography on Hearing*, contains well over 10,000 titles and includes all the entries of the earlier work. The expansion has been in several directions. The coverage prior to 1938 has been enlarged, new sources have elicited titles for the years 1939-1949, and of course the Bibliography has been brought up to date (1952). There has been expansion of subject matter also. Compared to the earlier edition, the present volume devotes more space to the psychology and the acoustics of music, to deafness and the deafened, to ultrasonics, and to the effects of drugs on human and animal hearing. New fields of inquiry, such as information theory, have been added.'

The student of hearing who peruses this compilation is likely to be amazed at the pace at which the literary output grows. His amazement should be matched by his gratitude to the authors for completing ably and efficiently a difficult task that needed doing. It is useful, too, to be able to cite to the bibliographically untutored who crowd our mail with requests for bibliographies on specific subjects within our area of interest and activity.

S. Richard Silverman
Central Institute for the Deaf
St. Louis, Missouri

Johnson, Wendell, (ed.) *Stuttering in Children and Adults. Thirty Years of Research at the University of Iowa.* Minnesota: University of Minnesota Press, 1955. Pp. 472. $5.00.

The publication of this book is a major historical landmark. Many significant research studies become readily available to students for the first time, and the blend of the past with the present is an intriguing one. From the foreword throughout, both the stimulating intellect and the warm personality of the editor shine through.

Assisted in the editing by Drs. Ralph Leutenegger, Dorothy Sherman, Arnold Golub, and David Williams, Dr. Johnson has put together a book of previously unpublished studies and papers produced at Iowa during his time. The work has been divided into eight parts, covering a general orientation, the onset of stuttering, nonfluency in childhood, variations in amount of stuttering, personality studies, explorations of physical approaches, a small group of historically interesting studies 'for the record,' and four articles on stuttering therapy. Papers by Johnson open and close the book.

A book of this kind is to be judged in two ways: (1) the cause served by the publication of the material and the job done in selecting, excerpting and abstracting—the editing itself; (2) the significance and worth of the studies which comprise its major content. There is no question that on both counts the overall quality of this book is high.

The early sections of the book include a more detailed presentation of Johnson's study of the onset and development of stuttering and Darley's study of parental attitudes and adjustments to the development of stuttering. A noteworthy feature of Darley's study, and one by no means universal in this collection, is the restrained manner in which conclusions are drawn from the data. Nonsignificant findings are left as such, without equivocal attempts to interpret from sample characteristics.

Though the book is an interesting historical marker, unless read with unusual discrimination it is going to be a very misleading one. Chiefly, this is due to the *ex post facto* character of so much of the contents. Major claims for scientific credit are made through elaborate and casual footnotes and introductory statements. One example is the preface to the adaptation studies, which seems to imply that all studies which involve counting moments of stuttering stem from Johnson.

A second example is Johnson's footnote on his article with Knott, which would indicate that he and Knott developed a conflict theory of stuttering, but kept it mothballed for years. Unless recent editorial changes were much more substantial than indicated, it is curious that such fundamental theorizing should have remained buried so long, and have found so little representation in the extensive published writings of either author over a span of twenty years.

In a very roundabout way it is further asserted that a conflict interpretation of stuttering was 'current in the Iowa situation' and might provide 'an orientation . . . for the many chapters of this volume.' In view of this claim it is striking that these studies make no attempt to relate themselves to such a theory, and in fact contain no reference to its existence.

On the other hand, in a gesture perhaps overly generous, in another footnote Dr. Johnson gives away credit for the first adaptation study, which by accepted scientific standards is actually due Johnson and Knott. The Van Riper and Hull adaptation study bears a 1955 publication date, and should not be considered as 'probably the first investigation of adaptation in stuttering,' when in terms of sequence of publication it is closer to the hundredth. Whatever contribution its appearance at this time makes has to be measured in terms of the field as it is today.

As it happens, the Van Riper and Hull study passes this stern test surprisingly well. It is their conclusion, for example, that the stutterer adapts to the situation itself, rather than to syntactical structure or word content. Use of adaptation as a measure of severity is suggested. Many other observations by these authors, and the systematic character of their thinking, makes this study recommended reading.

The largest collection of studies in the book, covering variations in the amount of stuttering, contains a high proportion of solid contributions. Though these cannot be contained in one or two sentences, here are some notable aspects of the findings:

Shulman: Massing of oral reading periods is conducive to greater adaptation than is obtained under distributed practice. Increasing 'social complexity,' measured by bringing more people into the room, retards adaptation. *Golub:* Adaptation decreases when words are varied during repeated readings. *Jamison:* Spontaneous recovery resembles a simple negatively accelerated positive growth function. Stuttering returns to its original strength by four and one-half hours following adaptation. *Frick:* Amount of spontaneous recovery is not shown to be affected by the degree of adaptation. *Donahue:* During three hours of continuous oral reading there is a consistent decrement in words stuttered. Stuttering tends to decrease with presumably increasing fatigue. *Connett:* One possible mechanism for perpetuation of stuttering is the stutterer's tendency to think of certain sounds as being particularly difficult. *Berwick:* Significantly more stuttering while reading to photographs of 'hard' listeners than to 'easy' listeners. *Chotlos:* Voluntary repetitions may result in increased stuttering. *Shane:* Masking noise significantly reduces stuttering.

A contrast to the careful regard for scientific method exemplified in most of the studies quoted above is provided by Fierman's study. This study was set up to investigate cues as secondary reinforcers, and because of insufficient subjects or poor choice of cues, or because the phenomenon does not really exist, negative results were obtained. This reviewer's impression is that the negative results were not reported straightforwardly and allowed to stand as such. Rather, a number of equivocal and somewhat misleading interpretations were made. Many of these could actually have been offered with better justification before the data were gathered.

Part Five, 'Certain Aspects of the Personal Adjustment of Stutterers,' deals with the sense of humor in stutterers and nonstutterers, stutterers' theories of their own stuttering, the speech situation rating sheet, the educational adjustments of stutterers, and the role of inhibition in the moment of stuttering.

Part Six covers explorations of physical approaches to the problem. Snidecor's study on tension and facial appearance in stuttering is noteworthy.

Part Seven contains historically interesting studies 'for the record.' It is fascinating to see two studies directed by Dr. John Fletcher, whose 1929 work, *The Problem of Stuttering*, is still one of the best books ever written on the subject. Studies by two of Travis' students are similarly worthwhile.

Part Eight, 'Approaches to Stuttering Therapy,' is highlighted by Williams' intensive case studies, and the chapter on bibliotherapy by Lynch. The book concludes with an early article by Johnson on semantics. A comprehensive bibliography of Iowa studies is appended.

In illustrating the contribution to our knowledge that can be made with a strict adherence to scientific method, the present work can be a model for the future. A group of carefully thought out, limited, controlled series of observations, such as this book contains, advances our knowledge substantially.

The lasting quality of the specific research contributions in this book is equally imposing. In view of the fact that many of these studies were conceived and carried out ten, twenty, and thirty years ago, they wear remarkably well. It is doubtful that a comparable volume in animal psychology, for example, would contribute enough to today's knowledge to merit publication.

In no small way the studies of this volume make up a personal tribute to Dr. Wendell Johnson. If the resulting perspective magnifies Iowa City like a Texan's map of Texas, this may be a permissible projection in one who has fathered so much of the product.

JOSEPH G. SHEEHAN
University of California

DORCUS, Roy C. (ed.) *Hypnosis and Its Therapeutic Applications*. New York: McGraw-Hill Book Company, Inc., 1956. Pp. 327. $7.50.

According to the editor's preface, the purpose of this book is to bring together in a single volume the various aspects of hypnosis: theoretical, experimental, and therapeutic. The approach is eclectic and judicious, even restrained. Although written primarily to serve the needs of a course in postgraduate medical education, the book has a broad appeal to professional workers in psychology, psychotherapy, and speech correction. Although it provides primarily a most readable and lucid introduction to the subject of hypnosis, its review of theories and experimental data as well as the selected topical references at the ends of chapters make it an extremely useful book for sophisticated readers.

In the survey and evaluation of theories of hypnosis, the work rejects the Pavlovian theory that hypnosis is a partial sleep, a protective inhibitory state that originates in the cerebral cortex and radiates to subcortical areas. This theory, which incidentally has had a contemporary defense in the essay written by K. I. Platanov, a student of Pavlov, and published by the State Publishing House of Medical Literature in Moscow, is again rejected as it was by Clark Hull. Other theories which are evaluated include the dissociation theory, the ideo-motor theory, the theory of goal directed behavior, and the theory of role-taking behavior as well as several theories of psychoanalytical origin that are perhaps too briefly treated to be understood. The conclusion presented, this reviewer presumes, will be acceptable to most readers: '. . . there is as yet no adequate theory of hypnosis.'

Of particular interest to the student are the reviews of experimental and clinical studies of the effects of hypnosis upon sensory and perceptive functions, and upon such indices of physiological function as reflex withdrawal, respiration, pulse, and galvanic skin response. The effects upon learning and the modification of habit are also summarized. Of more interest to clinical workers are the therapeutic applications of hypnosis. These are outlined in chapters with adequately descriptive titles: 'Symptom Control by Direct Suggestion,' 'Hypnosis in Supportive Therapy,' 'Hypnoanalysis: Methods and Techniques.'

The treatment of hypnoanalysis sharply and logically differentiates it from the more common brands of hypnotherapy and direct suggestion. Similarly, the necessary cautions and indications regarding the use of hypnoanalysis are urged.

Since eight authors cooperated in the preparation of this book, the mode of treatment and the style vary from chapter to chapter, not, however, in a manner which blocks communication. Instead, the eight have produced a surprisingly unified and comprehensive exposition of a difficult subject and have made available a readable, well-indexed book that commands respect and deserves study.

WILBUR E. MOORE
Central Michigan College

LURIIA, A. R. and IUDOVICH, F. Ia. *Rech' i Razvitie Psikhicheskikh Protsessov u Rebenka* (Speech and the Development of Mental Processes in the Child). Moscow: Izdatel 'stvo akademii pedagogicheskikh nauk, 1956. Pp. 93.

This book reports on the results of a study of identical twins (age 5) whose speech was arrested at a relatively early stage of development. After three months in the same nursery school class, the twins were separated by being placed in different groups of children with normal speech. One of the twins was given special speech training, while the other received no additional instruction.

After three months of separation, and again after ten months, the twins were tested as to their linguistic abilities and their general development. According to the authors, the separation 'created an objective necessity for extensive speech communication and served as an impetus for the rapid development of the speech of the twins, which in the course of three months acquired all basic features of fully developed speech of a five-year-old child.' The rapid development of speech in both children tended to overshadow the substantial addi-

tional progress made by the twin who received special instruction.

The authors state that the improved speech affected also the mental—as distinct from linguistic—development of the twins and attempt to demonstrate this by citing changes in the play activity of the children, in their ability to draw and to handle building materials, and in their performance on certain tests of 'intellectual capacity.'

MORRIS HALLE
Massachusetts Institute of Technology

TABER, CLARENCE W. *Taber's Cyclopedic Medical Dictionary*. 6th Edition. Philadelphia: F. A. Davis Company, 1954. Pp. 291. $4.75.

Everyone who works professionally with physicians or who reads medical literature should have available a good medical dictionary. There are a number of these published in the United States, and a speech pathologist would be well advised to look at several and choose the one he likes best. All the dictionaries have their strengths and weaknesses, and personal preference is as good a guide as any in making a choice.

The speech pathologist will naturally be concerned with the completeness and accuracy of the coverage of terms in his field. *Taber's Cyclopedic Medical Dictionary* is disappointing in this respect. Many terms are omitted and others are incorrectly defined. There is a section running to about two columns of text on 'speech abnormalities' which is so compressed as to be useless. The term *audiology* is not included in this dictionary; the field it refers to is almost entirely ignored. Only a few of the terms used in the area of aphasia are included. Other serious gaps could be listed.

For his own use, however, the speech pathologist is more concerned with wide and scholarly coverage of areas outside his field. In this respect Taber is reasonably satisfactory. Almost anyone can list a few terms that are missing from this or any other dictionary or that are improperly or incompletely defined. One suspects that a neurophysiologist would be particularly unhappy with the treatment of his field by medical lexicographers. But most of the terms one needs defined will be found in this book.

SPENCER F. BROWN
Darien, Connecticut

Abstracts

Acoustic Neurinoma

JONES, E. S. and KERR, A. S. Deafness occurring late in acoustic neurinoma. *Neurology*, 6, 1956, 377-380.

The authors present three case studies of patients who, contrary to the usual pattern, developed deafness late in the course of acoustic neurinoma. The authors discuss the phenomena and recommend that the absence of early deafness should not preclude the diagnosis or delay surgical measures. Audiometric examination is advised in all suspected cases.

(*B. S. Street*)

Adoptive Children

WITTENBORN, J. R., *et al.* A study of adoptive children. III. Relationships between some aspects of development and some aspects of environment for adoptive children *Psychol. Monogr.*, 70, Whole No. 410, 1956, 93-115.

Aphasia

ANDERSEN, H. C. and KRISTIANSEN, F. Directional preponderance of caloric nystagmus in aphasia. *Acta Psychiat. Neur. Scand.*, Suppl. 108, 1956, 23-27.

Abstracts is edited by William Tiffany, University of Washington, assisted by the following committee: Asa J. Berlin, Pennsylvania State University; Virginia B. Carroll, Minneapolis Veterans Hospital; Frederic L. Darley, State University of Iowa; Clair N. Hanley, University of Washington; Inez E. Hegarty, Mt. Holyoke College; John J. O'Neill, Ohio State University; John M. Palmer, University of Washington; Maryjane Rees, Sacramento State College; Frank B. Robinson, Miami University; Vivian I. Roe, University of Indiana; Bernard B. Schlanger, Vineland (N. J.) Training School; George H. Shames, University of Pittsburgh; Joseph G. Sheehan, University of California; Barbara S. Street, Minneapolis Veterans Hospital; Wayne L. Thurman, Eastern Illinois State College; John C. Webster, USN Electronics Lab., San Diego.

WERNER, H. Microgenesis and aphasia. *J. abnorm. soc. Psychol.*, 52, 1956, 347-353.

In considering the aphasic and his problem of reeducation, the author first makes the assumptions that the underlying functions of normal and abnormal behavior are not essentially different, and that higher mental processes are an unfolding process, or 'microgenesis,' which occur in developmental stages. It is noted that the recovery of aphasics proceeds in distinct developmental stages; observations in the therapeutic situation indicate that functioning at higher levels cannot emerge without proper functioning at lower levels. Therefore, says the author, it appears that reeducational guidance toward healthy language performance seems to be consistent with developmental stages observable under normal conditions of microgenesis.

(*J. G. Sheehan*)

Atresia

GOODMAN, M. Congenital atresia of the external auditory meatus. *Laryngoscope*, 66, 1956, 148-151.

'A brief survey of the embryological factors involved and the history of surgery for congenital atresia of the ears is given. A case report illustrating an excellent functional result in a boy with complete atresia of one ear and partial occlusion of the other, complicated by cholesteatoma, is discussed.'

(*Author's precis*)

Audiometric Case Report

TATO, J. M. Sindrome audiométrico de cortipatía sin desplazamiento del umbral. (Audiometrical syndrome of injury to the organ of Corti without decrease of the hearing threshold.) *Anales de Fonología y Audiología, Buenos Aires*, 1(1), 1955, 5-8.

The author describes the case of a patient who consulted the physician because of tinnitus and recruitment, but who gave audiometric results showing normal air and bone thresholds. A recruitment test is reported to show partial recruitment. Further audiometric findings included accentuated

auditory fatigue and disturbed auditory adaptation. Speech testing showed a normal threshold but with discrimination in noise and in quiet diminished. The author concludes that the functional alterations found demonstrate an injury to the organ of Corti occurring without hearing loss.

(*A. Dub, Montevideo, Uruguay*)

Audiometry

GUBERINA, P. L'Audiométrie verbo-tonale. (Verbal-tonal audiometry.) *Rev. Laryng., Paris*, 77, 1956, 20-58.

The author describes an auditory test in which words are presented through filters which pass only that band of frequencies presumably most essential for the intelligibility of each of the words. The author believes that this test is a valuable supplement to regular pure-tone and speech audiometry.

(*R. Goldstein, C.I.D.*)

JUERS, A. L. Pure tone threshold and hearing for speech—diagnostic significance of inconsistencies. *Laryngoscope*, 66, 1956, 402-409.

TATO, J. M. Sistema grafico de anotación audiométrica usado en la cátedra de Otorrinolaringologia y Fonoaudiologia de Buenos Aires. Propuesta de codificacion. (Graphic system of Audiometry signs used in the clinic of Otorhinolaryngology and Phono-Audiology in Buenos Aires. Proposition of Unification.) *Anales de Fonología y Audiologia, Buenos Aires*, 1(1), 1955, 25-31.

In this paper, read before the First Congress of the International Society of Audiology in Paris in 1953, the author presents a consistent set of symbols for the recording of audiometric test results, with the recommendation that the signs be standardized internationally.

(*A. Dub, Montevideo, Uruguay*)

Auditory Threshold Recovery

JERGER, J. F. Loudness adaptation following intense acoustic stimulation. *Sch. Aviat. Med.*, USAF, Rep. No. 56-9, Jan. 1956.

At 4000 cps, normal loudness adaptation (perstimulatory fatigue) to an 80 db SPL, 4000 cps, 10 minute tone and post-fatigue loudness adaptation to a 110 db SPL, 3000 cps, 100 second tone are investigated. Post-fatigue adaptation always exceeds normal adaptation, although both return to normal at the same rate. Relationships among adaptation, hearing loss 30 seconds after intense stimulation, and the 'bounce' in the recovery curve are discussed.

(*J. C. Webster*)

JERGER, J. F. The effect of stimulus intensity on the pattern of recovery from auditory fatigue. *Sch. Aviat. Med.*, USAF, Rep. No. 55-143, Jan. 1956.

The pattern of recovery of the auditory threshold following intense stimulation is characterized by a secondary maximum, or 'bounce,' occurring approximately two minutes after cessation of the fatiguing stimulus. The effect of the intensity of the fatiguing stimulus on this bounce phenomenon is investigated. Results are interpreted in terms of their significance for the problem of predicting susceptibility to permanent, noise-induced hearing loss.

(*J. C. Webster*)

Aural Harmonics

OPHEIM, O. and FLOTTORP, G. The aural harmonics in normal and pathological hearing. *Acta Otolaryng.*, 45, 1955, 513-531.

This is a report of an investigation of the aural harmonic thresholds of individuals with neurogenic and impedance types of hearing loss. The test for the aural harmonic threshold utilized the exploring tone method, with stimulus tones of 250 and 500 cps and intensities 40 to 50 db above threshold. Harmonic thresholds were found to be higher for individuals with impedance losses than for individuals with normal hearing. For the neurogenic type of hearing loss the thresholds were low, slightly above the hearing threshold. Also, there appeared to be a relationship between the recruitment phenomenon and abnormal aural harmonic thresholds.

(*J. J. O'Neill*)

Aural Surgery

PORTMANN, M. and CLAVERIE, G. Nouvelle orientation de la chirurgie de la surdité. (New orientation toward operations for deafness.) *Rev. Laryng., Paris*, 76, 1955, 817-850.

Increased knowledge from surgical experience indicates that various lesions of the

sound-conducting apparatus impose hearing losses for various reasons. Some effects may even neutralize each other and thus reduce the net hearing loss. Operations to improve hearing should attempt to restore or to maintain: (1) an unperforated drum membrane; (2) an unobstructed tympanic cavity and eustachian tube; (3) an ossicular chain which operates as a unit, like the columella of birds; and (4) normal mobility of the oval and round windows.

(*R. Goldstein, C.I.D.*)

Brain Damage

MASSERMAN, J. H. and PECHTEL, C. How brain lesions affect normal and neurotic behavior: an experimental approach. *Amer. J. Psychiat.*, 112, 1956, 865-872.

Over a period of six years 50 cats and 40 monkeys were closely observed for (1) their individual and social characteristics; (2) their capacity to learn various skills; and (3) the form and persistence of the experimental neurosis induced in 23 of the cats and 18 of the monkeys by exposure to adaptational conflicts. The animals were then subjected severally to lesions of the anterior or mediodorsal thalmus, the amygdalae, or cerebral areas 13, 23 or 24. Results indicate that the effects of cerebral lesions vary not only with their site and extent but also with (1) the preoperative experiences of each animal and (2) its postoperative care and re-training.

(*B. S. Street*)

MAXWELL, A. E. A statistical review of psychical symptoms in neurosurgical disease by E. Busch. *Acta Psychiat. Neur. Scand.*, 30, 1955, 483-497.

A statistical examination of E. Busch's article which appeared in *Acta Psychiatrica et Neurologica*, Vol. 15, 1940, reveals that psychical symptoms, impaired memory, and dyscalculia are of general occurrence whenever intracranial tumors are present. The author's statistical analysis substantiates the findings of Busch that psychical symptoms are more frequently associated with lesions in the non-dominant hemisphere. The author finds, however, no statistical evidence to substantiate Busch's postulation that this is due to increased severity of right side lesions.

Among a number of other findings were the following: (1) Aphasic symptoms occur only in left side lesions; (2) Gliomas in the dominant hemisphere are significantly accompanied by aphasia; and (3) No evidence is found to suggest an association between the kind of tumor and the hemisphere in which it is found.

(*B. S. Street*)

MORROW, R. S. and MARK, J. D. The correlation of intelligence and neurological findings on twenty-two patients autopsied for brain damage. *J. consult. Psychol.*, 19, 1955, 283-289.

Twenty-two adult males with various forms of brain pathology were matched for age and color with 22 psychiatric male patients. The Wechsler-Bellevue Intelligence Scale, Form II, was administered to both groups to determine the effect of structural brain pathology on intellectual activity. Autopsy examinations of the patients whose death resulted from brain pathology indicated the nature, extent and location of the pathology.

There was found to be a typical Wechsler-Bellevue test pattern for structural pathology. The Full Scale IQ and the Performance IQ, including all of the Performance subtests were significantly lower for the brain damaged population. No significant differences were found in the Vocabulary, Information and Comprehension Scores. Within the brain damaged population, significant differences were not found between focal and diffuse lesions. There were no indications of 'frontal lobe signs', but rather, patients with lesions located anterior to the Rolandic fissure showed less intellectual loss than those with lesions which were post-Rolandic. Patients with Dominant-hemisphere lesions showed significantly lower Verbal IQ and Performance IQ than did patients with bilateral lesions.

The results of the study were not compatible with the traditional brain theories which emphasized the roles of frontal lobes and dominant hemisphere in intellectual funtioning.

(*B. S. Street*)

Brain-Damaged Children

SCHLANGER, B. B. An Investigation of retarded brain-damaged children with delayed speech and language. *Train. Sch. Bull.*, 53, 1956, 64-74.

Twelve mentally retarded children between five to ten years of age, who were

brain-damaged and severely delayed in speech and language development, received from 18 to 24 months of speech therapy. Each child's performances were compared in language and speech behavior, and in auditory word discrimination. The results indicated that speech gains of varying degree were demonstrated by nine of the twelve children with the greatest improvement observed in communication responsiveness. However, these improvements were meagre when judged by normal standards. Another finding was that auditory discrimination scores both before and after therapy were vastly inferior to both normal scores and those of other retarded children.

Several possible causes for the language dysfunctioning are offered. It was concluded that a long period of therapy begun as early as possible is needed before a responsiveness level is attained that is conducive to direct work on speech and language.

(*Author's precis*)

Cerebral Palsy

DEAVER, G. G. Cerebral palsy: methods of treating the muscular disabilities. *Arch. phys. Med.*, 37, 1956, 363-367.

The author briefly reviews methods of treatment of the cerebral palsied advanced by Phelps, Fay, Kabat, Pohl, Swartz, and the Bobaths. He then presents his method, which 'has for its objective the training of the child to care for his daily needs, to ambulate, to have the maximum use of his hands, to develop adequate speech and hearing, and to have, insofar as it is possible, the appearance of being normal.' Comments are included on problems in selecting the 'educable child' for treatment.

(*F. L. Darley*)

DENHOFF, E., HOLDEN, R., and SILVER, M. Prognostic studies in children with cerebral palsy. *J. Amer. med. Ass.*, 161, 1956, 781-784.

Fifty cerebral palsied children were examined by pneumoencephalography. On the basis of the classification into which each child fell a prognosis was made of 'clinical improvement' over the next two years. The Stanford-Binet test (Form L) and the Vineland Social maturity scale were used to estimate intelligence levels of the children and on the basis of those results similar prognoses were made. Two years later a pediatrician evaluated the children's clinical improvement. There was an over-all agreement of 81% between the psychological predictions and the 'actual clinical progress' and of 72% between the pneumoencephalography predictions and the 'actual clinical progress.' The suggestion is made that these methods may be used for predicting long range improvement.

(*W. L. Thurman*)

MEYERS, R. Results of bilateral intermediate midbrain crusotomy in seven cases of severe athetotic and dystonic quadriparesis. *Amer. J. phys. Med.*, 35, 1956, 84-105.

An operative procedure, bilateral intermediate midbrain crusotomy, was employed in seven cases of quadriparetic cerebral palsy exhibiting severe tension athetosis. The results are reported as follows: markedly improved, 5; moderately improved, 1; slightly improved, 1.

Observations of postoperative recovery of head lifting, eye turning, showing the teeth, protruding the tongue, chewing, swallowing, speaking, etc., all 'undeniable evidences of some measure of intentional control of behavior,' lead to the conclusion that 'voluntary' movements are 'not the private business of the pyramidal tract,' which probably is completely interrupted by the operation.

An exhaustive bibliography and a thorough review of neurosurgery for the cerebral palsies are included.

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Child-Adult Interaction

MOUSTAKAS, C. E., SIGEL, I. E. and SCHALOCK, H. D. An objective method for the measurement and analysis of child-adult interaction. *Child Develpm.*, 27, 1956, 109-134.

A method for the objective description and recording of adult-child interaction is reviewed. It consists of a set of observational categories that can be employed in evaluating mother-child and therapist-child interaction. The technique is said to be satisfactory in terms of category and observer reliability.

(*J. J. O'Neill*)

Classroom Teacher

MAY, L. The classroom teacher and speech improvement. *Instructor*, 65(9), 1956, 87.

Suggested attitudes and procedures in dealing with the problem of speech defects

sound-conducting apparatus impose hearing losses for various reasons. Some effects may even neutralize each other and thus reduce the net hearing loss. Operations to improve hearing should attempt to restore or to maintain: (1) an unperforated drum membrane; (2) an unobstructed tympanic cavity and eustachian tube; (3) an ossicular chain which operates as a unit, like the columella of birds; and (4) normal mobility of the oval and round windows.

(*R. Goldstein, C.I.D.*)

Brain Damage

MASSERMAN, J. H. and PECHTEL, C. How brain lesions affect normal and neurotic behavior: an experimental approach. *Amer. J. Psychiat.*, 112, 1956, 865-872.

Over a period of six years 50 cats and 40 monkeys were closely observed for (1) their individual and social characteristics; (2) their capacity to learn various skills; and (3) the form and persistence of the experimental neurosis induced in 23 of the cats and 18 of the monkeys by exposure to adaptational conflicts. The animals were then subjected severally to lesions of the anterior or mediodorsal thalmus, the amygdalae, or cerebral areas 13, 23 or 24. Results indicate that the effects of cerebral lesions vary not only with their site and extent but also with (1) the preoperative experiences of each animal and (2) its postoperative care and re-training.

(*B. S. Street*)

MAXWELL, A. E. A statistical review of psychical symptoms in neurosurgical disease by E. Busch. *Acta Psychiat. Neur. Scand.*, 30, 1955, 483-497.

A statistical examination of E. Busch's article which appeared in *Acta Psychiatrica et Neurologica*, Vol. 15, 1940, reveals that psychical symptoms, impaired memory, and dyscalculia are of general occurrence whenever intracranial tumors are present. The author's statistical analysis substantiates the findings of Busch that psychical symptoms are more frequently associated with lesions in the non-dominant hemisphere. The author finds, however, no statistical evidence to substantiate Busch's postulation that this is due to increased severity of right side lesions.

Among a number of other findings were the following: (1) Aphasic symptoms occur only in left side lesions; (2) Gliomas in the dominant hemisphere are significantly accompanied by aphasia; and (3) No evidence is found to suggest an association between the kind of tumor and the hemisphere in which it is found.

(*B. S. Street*)

MORROW, R. S. and MARK, J. D. The correlation of intelligence and neurological findings on twenty-two patients autopsied for brain damage. *J. consult. Psychol.*, 19, 1955, 283-289.

Twenty-two adult males with various forms of brain pathology were matched for age and color with 22 psychiatric male patients. The Wechsler-Bellevue Intelligence Scale, Form II, was administered to both groups to determine the effect of structural brain pathology on intellectual activity. Autopsy examinations of the patients whose death resulted from brain pathology indicated the nature, extent and location of the pathology.

There was found to be a typical Wechsler-Bellevue test pattern for structural pathology. The Full Scale IQ and the Performance IQ, including all of the Performance subtests were significantly lower for the brain damaged population. No significant differences were found in the Vocabulary, Information and Comprehension Scores. Within the brain damaged population, significant differences were not found between focal and diffuse lesions. There were no indications of 'frontal lobe signs', but rather, patients with lesions located anterior to the Rolandic fissure showed less intellectual loss than those with lesions which were post-Rolandic. Patients with Dominant-hemisphere lesions showed significantly lower Verbal IQ and Performance IQ than did patients with bilateral lesions.

The results of the study were not compatible with the traditional brain theories which emphasized the roles of frontal lobes and dominant hemisphere in intellectual funtioning.

(*B. S. Street*)

Brain-Damaged Children

SCHLANGER, B. B. An Investigation of retarded brain-damaged children with delayed speech and language. *Train. Sch. Bull.*, 53, 1956, 64-74.

Twelve mentally retarded children between five to ten years of age, who were

brain-damaged and severely delayed in speech and language development, received from 18 to 24 months of speech therapy. Each child's performances were compared in language and speech behavior, and in auditory word discrimination. The results indicated that speech gains of varying degree were demonstrated by nine of the twelve children with the greatest improvement observed in communication responsiveness. However, these improvements were meagre when judged by normal standards. Another finding was that auditory discrimination scores both before and after therapy were vastly inferior to both normal scores and those of other retarded children.

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(*J. J. O'Neill*)

Classroom Teacher

MAY, L. The classroom teacher and speech improvement. *Instructor*, 65(9), 1956, 87.

Suggested attitudes and procedures in dealing with the problem of speech defects

in the classroom are offered to the teacher who is not a speech therapist.

(*B. B. Schlanger*)

Cleft Palate

FRASER, C. F. Etiological factors in congenital cleft palate. *Amer. J. Dis. Child.*, 90, 1955, 530-531.

This paper deals with the experimental production of cleft palate in mice by several techniques including starvation and treatment with cortisone.

(*F. L. Darley*)

HILL, M. J. An investigation of the attitudes and information possessed by parents of children with clefts of the lip and palate. *Cleft Palate Bull.*, 6(1), 1956, 3-4.

Seventy parents of children with clefts were given specially constructed tests of attitudes and information about their handicapped children. There is reported to be a strong suggestion of a relationship between parental attitudes and the amount of information the parents possess. Information-giving sessions with parents are recommended as part of a total rehabilitation program.

(*A. J. Berlin*)

KESSLER, H. E. The cleft palate rehabilitation team. *Dent. Dig.*, 62, 1956, 69-74.

This article reports a study on the improvement in the cleft palate rehabilitation program in Cleveland. The value of the team approach and the roles of the members of this group are described.

(*G. H. Shames*)

KLINGER, H. A palatographic and acoustic study of cleft palate speech. *Cleft Palate Bull.*, 6(2), 1956, 10-12.

Palatograms and speech sounds of five cleft palate speakers and five normal speakers were compared for differences in linguapalatal contacts and intelligibility. Except for plosives and nasals, on which there were no differences, the normals had a greater percentage of palatal contacts on all types of sounds than did the cleft palate speakers. Significantly more of the cleft palate speakers had 'atypical' palatal contacts. These atypical contacts are said to have had a seriously adverse effect on the intelligibility of the sounds.

(*A. J. Berlin*)

LILLYWHITE, H. The Oregon cleft palate program. *Cleft Palate Bull.*, 6(1), 1956, 6-7.

MCKEE, T. L. A cephalometric radiographic study of tongue position in individuals with cleft palate deformity. *Angle Orthodont.*, 26, 1956, 99-109.

This study was designed to investigate the various positions of the tongue in cleft lip and palate subjects and to compare these positions with those of non-cleft subjects. The positions of the tongue (1) with the mandible at physiologic rest position, (2) with the teeth in occlusion and (3) during the phonation of the vowel [u], were pictured using various radiographic techniques. The author concludes that, for all three positions, the tongue is carried much higher in non-cleft subjects, the dorsum is more convex in shape for non-cleft subjects at physiologic rest and is not, in most cases, against the hard palate. Movement of the high point of the tongue from rest to the vowel [u] is primarily a posterior shift rather than a superior shift.

(*C. N. Hanley*)

MCWILLIAMS, B. J. Some components in the intelligibility of the speech of 48 cleft palate adults. *Cleft Palate Bull.*, 6(2), 1956, 7-10.

A sample of 48 cleft palate adults recorded a prose selection and a list of phonetically balanced words and phrases. The number and type of consonant errors were evaluated for each sample, and three reliable auditors produced ratings of intelligibility and nasality. The findings indicated that intelligibility in cleft palate patients is related to the articulation of consonants. Each patient seemed able to produce all the consonants correctly at some time. As consonant errors increased, so did the judgment of nasality. Suggestions are made for a rating scale based on consonant errors, and for speech therapy directed at articulatory improvement rather than velopharyngeal closure.

(*A. J. Berlin*)

MCWILLIAMS, B. J. Some observations of environmental factors in speech develop-

ment of children with cleft palate. *Cleft Palate Bull.*, 6(1), 1956, 4-5.

PIERCE, G. W., TERWILLIGER, K. F., PENNISI, V. and KLABUNDE, E. H. Early orthodontic treatment in cleft palate children. *Angle Orthodont.*, 26, 1956, 110-120.

This paper discusses the rationale for early orthodontic management. The authors suggest that treatment should be instituted at four years of age or as soon as the child becomes cooperative. Their clinical experience has shown that more normal occlusion and function, better appearance of the patient, and less need for secondary treatment are obtained in this way. The authors cite a number of clinical cases as examples of early orthodontia with resulting good function and appearance.

(*C. N. Hanley*)

RICKETTS, R. M. Oral orthopedics for the cleft palate patient. *Amer. J. Orthodon.*, 42, 1956, 401-408.

TENDRICH, M. I. Reconstruction procedure for corrected cleft palate patient. *Dent. Dig.*, 62, 1956, 206-208.

TRASLER, D. G., CLARK, K. H. and FRASER, F. C. No cleft palates in offspring of pregnant mice given cortisone after fetal palate closure. *J. Hered.*, 47, 1956, 99-100.

Previous studies have shown that cleft palates could be produced in the offspring of pregnant female mice treated with cortisone acetate before the time of normal embryonic palatal closure. The present study indicates that cortisone acetate administered to pregnant female mice after the time of fetal palatal closure cannot produce cleft palate. 108 treated female mice produced 525 young with normal palates. In the control group, seven of the 2,501 offspring had cleft palates without cleft lips.

(*I. E. Hegarty*)

VANHATTUM, R. J. Interrelationships among measures of nasality and articulation. *Cleft Palate Bull.*, 5(4), 1955, 3-5.

This study was designed to test the hypothesis that judgments of articulatory ability and nasality in the speech of cleft palate patients are negatively related. Recordings of 20 cleft palate patients were evaluated by expert judges. These evaluations are reported to reveal that in the majority of cases the more adequate the articulation, the less nasality is to be noted in sentences. On the other hand there was no correlation between articulatory skill and nasality of isolated vowels.

(*A. J. Berlin*)

Cochlear Microphonics

ENGSTROM, H. Morphological studies on the possible origin of cochlear microphonics. *Rev. Laryng., Paris*, 76, 1955, 808-816.

According to the author, electron microscopy reveals structures, just internal to the plasma membrane of the outer hair cells of the organ of Corti of guinea pigs, which may convert mechanical energy into cochlear microphonics during auditory stimulation.

(*R. Goldstein, C.I.D.*)

Communication Theory

STUMPERS, F. L. A bibliography of information theory (communication theory—cybernetics). *IRE Transactions on Information Theory*, Vol. IT-1 (2), 1955, 31-47.

This bibliography, of approximately 1000 items, includes sections on speech, hearing, linguistics, semantics, group communication, learning and television. There are approximately 150 items in the fields of speech, hearing, linguistics and semantics.

(*W. R. Tiffany*)

Deafness

CLAVERI, G. Considérations sur les surdités au cours des maladies a virus. (Study of deafness as a result of viral illnesses.) *Rev. Laryng., Paris*, 77, 1956, 116-147.

From clinical reports of others and from his own observations, the author concludes that viral infections as such seldom lead to deafness.

(*R. Goldstein, C.I.D.*)

POST, R. H. and HOPKINS, L. A. 'Deaf-mutism' in two pairs of identical twins. *J. Hered.*, 47, 1956, 88-90.

Detailed case studies of two pairs of monozygotic twin girls with hearing loss are presented.

(*I. E. Hegarty*)

Delayed Speech

MORLEY, M., COURT, D., MILLER, H. and GARSIDE, R. F. Delayed speech and developmental aphasia. *Speech*, 20, 1956, 4-14.

A classification of speech disorders in childhood is presented and defined. The authors consider the diagnosis of developmental aphasia when delayed speech cannot be attributed to mental deficiency, deafness, cerebral palsy, or psychosis. Fifteen children with prolonged speech delay and inadequacy were studied intensively. There was no evidence that social class, position in family, birth injury, illness, laterality or family predisposition had any clear relationship to developmental aphasia. Suggestions for examination and treatment are given.

(*A. J. Berlin*)

Emotional Aspects of Disease

KERN, E. N. Psychological and emotional aspects of diseased or injured persons. *Phy. Therapy Rev.*, 36, 1956, 302-314.

The author discusses the psychological and emotional problems which frequently occur with patients who are hospitalized with tuberculosis, paraplegia, cerebral palsy, or poliomyelitis.

(*B. S. Street*)

Empirical Contributions to Therapy

VAN THAL, J. H. The value of empirical contributions to speech pathology and therapeutics. *Speech*, 20, 1956, 19-22.

This essay defends the empirical method, suggests that therapeutic procedures should be selected from a variety of sources, and urges a wide sharing of techniques and results among therapists.

(*A. J. Berlin*)

Exceptional Child

NEWLAND, T. E. Helping the exceptional child in the regular classroom. *Understanding the Child*, 25, 1956, 66-80.

GRAHAM, R. and BARROW, J. M. Plan a place for the exceptional child. *Nation's Schs.*, 58(1), 1956, 47-54.

It is suggested that proper and adequate facilities for exceptional children be provided by local administrators and boards of education working with their architects. Suggestions are made for determining needs and allocating facilities. The classroom and equipment requirements for several types of exceptional children are considered.

(*A. J. Berlin*)

SALISBURY, A., BARROW, J. M. and GRAHAM, J. P. Building aids integration of physically handicapped. *Nation's Schs.*, 58(2), 1956, 62-67.

The authors describe a new special education addition to a Galesburg, Illinois, elementary school.

(*A. J. Berlin*)

Fenestration

WERTH, R. Fenestration after attempted mobilization of stapes (Rosen's operation) for otosclerosis. *Acta Otolaryng.*, 46, 1956, 70-73.

Sixteen cases of failure of stapes mobilization were fenestrated 2 to 15 months after mobilization. All but three of the cases showed significant audiometric changes, with an average improvement of 26 decibels. Thus, it appeared that attempted stapes mobilization had no great influence upon the results of a fenestration operation.

(*J. J. O'Neill*)

Group Therapy

FINEBURG, H. H., JOHNSON, M., LEIDEN, I., and LYNCH, H. Group therapy in a children's hospital: preliminary report. *Pediatrics*, 17, 1956, 544-548.

The authors discuss the rationale and the problems of structuring for group therapy with children in a pediatric hospital.

(*B. B. Schlanger*)

Harmonic Generator

PRENTON, W. A. and COURT, G. W. G. A harmonic generator with tuning fork drive. *Electronic Eng.*, 28 (335), 1956, 13-15.

'A circuit is described which generates harmonic frequencies from a fundamental provided by a simple valve-maintained tuning fork. A suitable wave form is generated from the fundamental sinusoid and its harmonics all selected by a frequency-selective amplifier. Harmonics up to and including the fourth are readily obtained from a fundamental frequency of 560 cps, with a frequency stability of the order of 1 part in

10^4 per°C. The range can be extended to harmonics up to the 10th.'

(*Authors' precis*)

Hearing Acuity

CURRY, E. T. and BOYS, F. Effects of oxygen on hearing acuity at simulated altitude. *Eye, Ear, Nose, Thr. Mon.*, 35, 1956, 239-245.

The effects of both oxygen deficiency and excess on the hearing acuity of male subjects were investigated. Subjects were elevated, in a low pressure chamber, to a simulated altitude of 15,000 feet. Audiometric thresholds were obtained prior to elevation and after 30 minutes of elevation. This procedure was repeated on a second day but in this instance subjects breathed oxygen throughout the period of elevation. No apparent changes in auditory acuity occurred during the first testing situation. However, the breathing of oxygen at altitude resulted in a lowering of both air and bone conduction thresholds whereas the breathing of oxygen at ground level did not produce any noticeable change in auditory thresholds. The author lists possible sources of experimental error that may have influenced the test results.

(*J. J. O'Neill*)

Hearing Aids

BENDER, R. How children should wear hearing aids. *Hearing Dealer*, 6 (5), 1956, 8-9.

Hearing in Aircrews

HINCHCLIFFE, R. An appraisal of the present method of assessing hearing in aircrews. *J. aviat. Med.*, 27, 1956, 239-245.

A suggested testing routine to be employed in the assessment of the audiologic adequacy of R.A.F. flying personnel is reviewed.

(*J. J. O'Neill*)

Incidence of Speech Defects

MCCALLIEN, C. Problems of speech defect in the Accra district. *Speech*, 20, 1956, 15-18.

This preliminary report is probably the first published information about speech defects in the Gold Coast. A total of 3988 school children were interviewed in English and native languages. Articulatory differences were recorded only if they were considered defective by the child or his classmates. Three hemiplegics had dysarthria and dysphasia. No cleft palate or harelip conditions were found. Dyslalia was the commonest type of defect, occurring in from 7.3 to 11 per cent of the children. The most frequently affected sounds were [s], [r] and [l]. Stammering appeared in 3.5 per cent of the children. Although more boys than girls stammered, the difference was not marked. Sixty-six per cent said they stammered since infancy. Bilingualism, left-handedness, and change of laterality are reported to have shown a significant association with stammering.

(*A. J. Berlin*)

Infant Development

WITTENBORN, J. R. The predictive validity of the Yale developmental examination of infant behavior. *Psychol. Monogr.*, 70, 1956, 59-92.

The author is concerned with the predictive values of the Yale Developmental Infant Examination developed by Gesell and his associates. He finds evidence to indicate the presence of predictive validity. His investigation is primarily concerned with criteria which other investigators have not employed and with hitherto unexamined facets of the infant examination.

(*J. G. Sheehan*)

Intelligibility

GOTTFRIED, A. and IKRATH, K. Evaluation of interference effects on speech communication. SCEL. Tech. Memo M-1748, 9 Apr. 1956.

A method is described for finding the interaction between noise interference and speech at the output of a radio receiver so that the articulation index (AI) can be calculated from physical measurements of noise alone and speech alone.

(*J. C. Webster*)

MOSER, H., DREHER, J. and ADLER, S. Sentence form and intelligibility. *Air Research and Development Command Technical Report*. RF Project 519, Report No. 15, AFCRC-TR-54-85, September, 1954.

Differences in air control tower message efficiency between 'telegraphese' (abbreviated sentence form) and 'full dress' (normal

grammatical sentence form) as spoken by speakers of five nationalities were tested. Two speakers of each nationality recorded messages typical of eight subject categories with a 'light white noise' masking. Three hundred American Air Science students heard and recorded the messages. No significant differences were found between types of messages nor among nationalities of speakers.

(*W. L. Thurman*)

PETERS, R. W. The relative intelligibility of single-voice and multiple-voice messages under various conditions of noise. Joint project report No. NM 001 104 500.56. Ohio State U. Res. Fndtn. and USN School Aviat. Med., 1 July 1955.

The Voice Communication Laboratory (VCL) multiple-choice words, read in groups of three words, were recorded by one talker and by three talkers (one talker per word) and played back to listening panels in various levels of white noise and speech babble. Single-voice transmissions were consistently more intelligible and resisted the increasing levels of noise better than the multiple-voice transmissions.

(*J. C. Webster*)

PETERS, R. W. Studies in listener reception of voice messages: The persistence of the effects of listening conditions. Joint project report No. NM 001 104 500.55. The Ohio report No. NM 001 104 500.55. Ohio State U. Res. Fndtn. and USN School Aviat. Med., 30 June 1955.

Three groups listened to phonetically balanced words at zero db speech-to-noise (S/N) ratios after each group had been indoctrinated to similar words at different S/N ratios, namely +8, 0, and —8 db. The group indoctrinated at —8 db obtained reception scores significantly lower than the other two groups.

(*J. C. Webster*)

PETERSON, G. E., SIVERTSEN, E. and SUBRAHMANYAM, D. L. Intelligibility of diphasic speech. *J. acoust. Soc. Amer.* 28, 1956, 404-411.

'This study concerns the intelligibility of speech under various periodic switching operations. In diphasic speech the signal is separated into successive segments which are reversed in phase. The intelligibility of this speech was found to be high for switching frequencies below about 100 cps; in the intermediate audio-frequency region the intelligibility falls to very low values. Throughout this intermediate frequency region, the intelligibility of diphasic speech is markedly less than that of interrupted speech. Some explanation for this difference is found in the Fourier expansion for the two cases. In interrupted speech the original spectrum is retained, but in diphasic speech terms for the spectrum in its normal form do not appear. It was experimentally observed that throughout the intermediate frequency region binaural diphasic speech, in which the signal is switched alternately from one ear to the other, is more intelligible than monaural diphasic speech or interrupted speech.'

(*Authors' precis*)

WEBSTER, J. C. and THOMPSON, P. O. Factors affecting speech intelligibility in aircraft control towers. Navy Electronics Laboratory Report 357. 10 March 1953.

Noise, intelligibility of signal, and operator fatigue were studied as they affect control-tower operations. The words of the VCL multiple-choice lists were incorporated into standard aircraft-control-tower phraseologies. The speech to noise ratio, the density of messages per channel, the degree of overlap among messages were studied, and the spatial separation of message channels were all found to affect word articulation scores.

(*J. C. Webster*)

Intensity DL

TONNDORF, J., BROGAN, F. A. and WASHBURN, D. D. Auditory difference limen of intensity in normal-hearing subjects. *Sch. Aviat. Med.*, USAF, Rep. No. 55-31, Aug. 1955.

The method of regular amplitude modulation is used to determine intensity difference limen at various frequencies and intensities. The results show (1) no change in difference limen after the introduction of masking noise, (2) that the difference limen is a continuous function of sensation level, and (3) that loudness is a complex, not a direct, function of the difference limen.

(*J. C. Webster*)

Interpersonal Communication

MELLINGER, G. D. Interpersonal trust as a factor in communication. *J. abnorm. soc. Psychol.*, 52, 1956, 304-309.

Data are presented from a study in a large governmental research organization which support the author's hypothesis that an individual is likely to distort his own attitudes when communicating them to people he distrusts. Two factors are noted which may influence the extent to which distrust imposes a barrier to accurate communication: the relative status of the two persons and the nature of the issue.

(*J. G. Sheehan*)

Labyrinth Stimulation

BEHR, K., PREBER, L. and SILFVERSKIÖLD, B. P. Recording of the skin resistance in thermal and rotatory stimulation of the labyrinth. *Acta Psychiat. Neur. Scand.*, 30, 1955, 740-748.

In order to investigate nausea associated with sweating that may attend rotatory and vestibular stimulation, a specially designed apparatus was employed to make graphic recordings of the variations in skin resistance. Fifty subjects were tested. The findings indicated that vertigo induced by slight rotatory stimulation was sometimes accompanied by a fall in skin resistance that was difficult to distinguish from nonspecific falls due to emotional factors. After a latent period of two to three minutes thermal stimulation often produced a pronounced fall in skin resistance coincidently with nausea. The fall sometimes appeared without demonstrable sweating or other signs of nausea. Possible causes of this evidently characteristic fall in skin resistance are discussed. The authors feel that the method employed is an efficient means of recording vegetative vestibular reactions.

(*B. S. Street*)

Language

BAKER, S. Constancy factors in language: introduction to the mechanics of thought. *J. gen. Psychol.*, 52, 1955, 255-283.

The article offers further evidence to illustrate the operation of the so-called linguistic law of constancy. Protocols obtained from 20 speakers and writers were analyzed in a statistical study of word variety, word distribution, and perseveration. The results indicate that new words are used at a slowly diminishing and well regulated rate. Also there is reported a tendency toward equalized distribution of words. Words that appear more than once in a given text have their repetitions in close proximity to the original appearance. It is postulated that this process of perseveration may be a part of the mechanism of verbalized thought.

(*J. J. O'Neill*)

Larynx Mechanism

FINK, B. R. and EPANCHIN, V. The mechanism of opening the human larynx. *Laryngoscope*, 66, 1956, 410-425.

'Motion pictures of human vocal cord movements show that opening and closure of the glottis are accompanied by sliding movements of the arytenoids to and from the midline. Rotation of the cartilages does not occur.

'Roentgenographic evidence demonstrates that the rhythmic movement of the larynx down and up the neck with respiration causes alternate folding and unfolding of the laryngeal soft tissues, after the fashion of a bellows, and impresses a medio-lateral sliding motion on the arytenoids.

'Electromyography of intrinsic and extrinsic laryngeal muscles reveals the presence of continuous tonic activity in the intrinsic muscles. It is suggested that continuous balanced activity in these muscles is necessary to stabilize the cricoarytenoid joint. The pattern of activity in the extrinsic muscles indicates that these play a major role in controlling the lateral excursion of the arytenoid cartilages and glottis.'

(*Authors' precis*)

Learning

BERG, J. and WORCHEL, P. Sensory contributions to human maze learning: a comparison of matched blind, deaf and normals. *J. gen. Psychol.*, 54, 1956, 81-93.

In order to determine whether verbalization or visualization were superior to motor imagery in the learning of a maze problem, 28 congenitally deaf, congenitally blind, and normal individuals were studied. The congenitally deaf were considered to be de-

ficient in verbalization skill and the congenitally blind lacking in visualization skill. On the basis of performances on two types of finger tracing tests it appeared that the presence of verbalization skill played the major part in the handling of maze problems.

(*J. J. O'Neill*)

Linguistic Constancy

SMITH, M. Linguistic constancy in individuals when long periods of time are covered and different types of material are sampled. *J. gen. Psychol.*, 53, 1955, 109-143.

The purpose of this study was to investigate the effects of time on the constancy of linguistic usage. An analysis was made of essays, diarys, and journals written at different time periods by two women of above average intelligence. Except for sentence length there was not much difference between diaries and journals written during childhood but there were many differences in adult years. The differences of occurrence between certain types and frequencies of words were not considered to be indices of normality.

(*J. J. O'Neill*)

Listening

PRATT, E. Experimental evaluation of a program for the improvement of listening. *Elem. Sch. J.*, 56, 1956, 315-320.

The effects of a program designed to develop certain specific skills in the listening process were evaluated. Listening skills were introduced to an experimental group of sixth-grade children and training in these skills was provided. The author indicates that teaching listening ability to these children can be effective. Other findings demonstrate that there is a positive correlation between (a) listening ability and reading ability, and (b) listening ability and intelligence.

(*B. B. Schlanger*)

Loudness Matching

POLLACK, I. Identification of sound level and 'matching from sample.' *J. acoust. Soc. Amer.*, 28, 1956, 412-415.

'The "identification" and "discrimination" of components of elementary auditory displays are here differentiated in terms of the relative contiguity between the unknown signal and the set of possible signals that may be chosen. Listeners attempted to match arbitrary designations to sound levels of a tone under three conditions of relative contiguity between the unknown sound level and the set of possible sound levels. Significant improvements in matching are associated with increasing contiguity, especially under finely subdivided conditions encompassing a wide range of sound levels.'

(*Author's precis*)

Masking

JEFFRESS, L. A., BLODGETT, H. C., SANDEL, T. T. and WOOD, C. L. III. Masking of tonal signals. *J. acoust. Soc. Amer.*, 28, 1956, 416-426.

This paper discusses a number of the facts regarding the masking of one tone by another, the masking of tone by noise, signal duration, phase effects, and binaural and monaural masking. The authors point to the many contradictions to be found in the literature and suggest two models, one for binaural and one for monaural listening, to aid in the understanding of tonal masking.

(*C. N. Hanley*)

Negative Transference

ALEXANDER, P. R. and POPE, H. L. The negative transference: some comments on its manifestations, development and management. *Amer. J. Psychother.*, 10, 1956, 5-17.

Noise

ELDRED, K. N., GANNON, W. J. and VON GIERKE, H. Criteria for short time exposure of personnel to high intensity jet aircraft noise. *Wright Air Development Center*, TR 55-355, Sept. 1955.

Criteria are presented which specify the maximum noise levels to which maintenance personnel servicing turbo-jet aircraft may be routinely exposed for durations ranging from several seconds to eight hours in any twenty-four hour period. Duration vs. noise levels are given for cases of both the unprotected and protected ear. Examples are given which illustrate use of these criteria to define zones around aircraft in which personnel must wear ear plugs, ear muffs, or both protective devices in combination.

(*J. C. Webster*)

JERISON, H. J. and SMITH, A. K. Effect of acoustic noise on time judgment. *Wright Air Development Center*, TR 55-358, October 1955.

Fourteen normal hearing subjects were asked to press a telegraph key at ten minute intervals while working on another job that kept them almost completely occupied. In a two-hour control session the over-all noise level was about 77.5 db. In another two-hour experimental session the first half hour was in the 77.5 db noise field and the last one and one-half hours were in an over-all noise field of about 111.5 db. In the control sessions the subjects responded about every nine minutes on the average. In the experimental sessions the subjects responded about every seven minutes. The results are discussed in terms of effects of motivation on time judgment and in terms of a neural model for the construction of subjective time involving the normal activity of the central auditory nervous system.

(*J. C. Webster*)

Noise Protective Devices

DICKSON, E. D. D., HINCHCLIFFE, R. and WHEELER, L. J. Ear defenders. *Flying Personnel Res. Comm.* Report 884, Air Ministry, London, June 1954.

HARRIS, J. D. An evaluation of ear defender devices. *USN Med. Res. Lab.*, New London. Report 271, December 1955.

HEMBREE, H. W. and GAYDOS, H. F. Acoustic transmission properties of winter headgear. *Quartermaster Res. and Dev. Center* TR-EP-19, Natick, Mass. August 1955.

NEELY, K. K. and ROCK, B. J. Acoustic properties of headgear IV: ear protective devices. *Def. Res. Med. Lab.* Report 100-5, Toronto, Canada, June 1955.

TOLHURST, G. C. Noise attenuation of 3 personnel noise protective devices. Ohio State U. Res. Fndtn. and USN School Aviat. Med. Special Report 55-6, May 1955.

WEBSTER, J. C. Ear defenders: Measurement methods and comparative results. *USN Electronics Lab* Reprint Report 701, September 1955.

WEBSTER, J. C., BEITSCHER, H. R. and SILKWOOD, J. A. Acoustic attenuation of noise shielding devices. *USN Electronics Lab* Report 482, March 1954.

Objective Audiometry

DERBYSHIRE, A. J., WOOLEY, PAUL V., JR., MCDERMOTT, MARY D. and FRASER, ALAN R. The use of the electroencephalogram in the evaluation of hearing in the preschool age child. *Amer. J. Dis. Child.*, 90, 1955, 649-650.

One hundred and fifty children ranging in age from three months to 15 years were tested under conditions of sleep with click and tone stimulation. The results suggest the usefulness of the EEG in connection with clinical and audiologic observation in evaluating hearing in 'aphasic' and 'brain damaged' children between the ages of three months and four years.

(*F. L. Darley*)

GERSHUNI, G. V. O nekotorykh novykh metodakh izmereniia slukha u cheloveka i poluchennykh pri ikh pomoshchi rezul'tatakh (On some new methods of the measurement of hearing in man and on results obtained with the aid of these methods). *Akusticheskii Zhurnal* (*Acoustics Journal USSR*), 2, 1956, 137-141.

In the article are given data establishing new methods of measuring hearing, based on the utilization of conditioned reactions to sound by man. Data are presented showing (1) that absolute thresholds of hearing and difference limens for frequency and intensity of pure tones can be measured in man by means of these reactions with the same reliability as by means of verbal response; (2) that in some cases conditioned reflexes appear that are subliminal by 1 to 6 db with reference to the verbal response. On the basis of the gathered facts attention is called to the significance of central mechanisms that sharpen and dull the degree of differentiation of frequency and intensity of tonal signals. (Translation of author's summary.)

(*M. Halle, M.I.T.*)

GOLDSTEIN, R. Effectiveness of conditioned electrodermal responses (EDR) in measuring pure-tone thresholds in cases of nonorganic hearing loss. *Laryngoscope*, 66, 1956, 119-130.

The author presents a report on the effectiveness of PGSR (or EDR) hearing tests of 20 patients suspected of non-organic hearing loss and discusses the possible factors leading to the failure of conditioning in half of these cases. A promising clue to predicting the success of EDR conditioning is said to arise from the observation of a strong, 9-11 per second, rhythm observed in the EEG's of those subjects from whom electrodermal responses were difficult to elicit. The author also concludes 'that simultaneous EEG and EDR recording may be desirable, because quite often changes will occur in the EEG as a result of the tone when no EDR can be detected.'

(*W. R. Tiffany*)

Organic Behavior Disorder

MILMAN, D. H. Organic behavior disorder. *A.M.A. J. Dis. Child.*, 91, 1956, 521-528.

Twenty-two cases of brain-injured children were studied. The distinctive clinical features reported were 'motor incoordination, perceptual difficulties, anxiety, social ineptness, speech and reading disabilities, and school failure.' Tables present data concerning etiology, significant medical and neurological findings, psychological test findings, reading ability, behavioral and personality traits, social adjustment, school records, parental attitudes, and the results of treatment. Speech was found to be impaired in 13, clear in eight; there is no report on the speech of one case. Speech defects noted included poorly articulated speech in 12 cases, disturbances of rhythm in five cases, and consonant substitutions in five cases. 'An interpretation of the clinical syndrome is offered in terms of the dynamic effects of brain damage.' Recommendations are made for clinical management, parental guidance, and pedagogical handling.

(*F. L. Darley*)

Pain Thresholds

CLARK, J. W. and BINDRA, D. Individual differences in pain thresholds. *Canad. J. Psychol.*, 10, 1956, 69-76.

Experimental data are presented which are said to show that differences in pain threshold are in a large part due to attitudinal variables. A high correlation was found between tolerance levels and pain thresholds.

(*J. G. Sheehan*)

Personality

DAVIDS, A. Personality dispositions, word frequency, and word association. *J. Pers.*, 24, 1956, 328-338.

The number of associations given in response to a chained word-association test was investigated as a function of personality dispositions, relevance of the stimulus words to dispositions involved, and frequency of the stimulus words according to the Thorndike-Lorge semantic word count. Frequency is of significance only when considered in combination with dispositions and personality groups. It is concluded that the influence of frequency may be extremely limited, and has little to offer toward the understanding of individual differences in human behavior.

(*J. G. Sheehan*)

GERVIN, V. Individual behavior in social situations: its relation to anxiety, neuroticism, and group solidarity. *J. exp. Psychol.*, 51, 1956, 161-168.

GETZELS, J. W. and GUBA, E. G. Role conflict and personality. *J. Pers.*, 24, 1955, 74-85.

Presentation of Patients

LIEF, H. I. Should patients be presented in person? *Psychoanal. Rev.*, 43, 1956, 57-67.

The aim of this study was to determine whether the presentation of patients undergoing therapy before groups has a negative effect upon their recovery. Patients were presented before a group of staff members or before a single supervisor, and the effects of these presentations were analyzed. The author found that the majority of patients and therapists reported that the presentations were helpful. When two groups were compared, presentation before a group of residents and staff members was found to have a better effect than presentation before a single supervisor.

(*J. G. Sheehan*)

Projective Techniques

PHILLIPSON, H. Direction of development in projective techniques. *Brit. J. med. Psychol.*, 29, 1956, 139-150.

Psychoanalysis

MOSSE, E. P. The handling of relatives in

the psychoanalytic situation. *Psychoanal. Rev.*, 41, 1954, 258-262.

The author presents an alternate method in the treatment of relatives of patients undergoing psychoanalysis. The most common solutions to this problem are either removing the patient from his environment or assigning the same therapist or another therapist to treat the family. Mosse's alternate method allows the patient to act as a therapist by treating the relatives himself. The author discusses the limitations and dangers inherent in this technique, as well as its values to the patient himself.

(*J. G. Sheehan*)

Psychodrama

BLAKE, R. R. Experimental psychodrama with children. *Group Psychother.*, 8, 1955, 347-350.

Psychodrama is described as a technique which provides a better understanding of the child's subjective world, and as a valuable tool for manipulating the child's perception and experience. The author feels that this technique is not inconsistent with other methods of training and therapy.

(*J. G. Sheehan*)

Psychogalvanometer

WITHERS, W. L. R. A simple psychogalvanometer. *Electronic Eng.* 28 (335), 1956, 36-37.

The author describes a circuit for a psychogalvanometer which can be easily constructed, calibrated and employed.

(*C. N. Hanley*)

Psychotherapy

ANDERSON, W. On the practice of psychotherapy by the nonmedically trained. *Amer. Psychologist*, 2, 1956, 197-199.

Arguments for and against nonmedical practice of psychotherapy are summarized, and Freud's position on the question of lay analysis is considered. The author agrees with Freud that possession of a medical degree is not an essential requirement, and that after a medical examination which rules out organic pathology the nonmedical analyst can carry out the analysis quite adequately.

(*J. G. Sheehan*)

STARR, P. H. The 'triangular' treatment approach in child therapy: complementary psychotherapy for mother and child. *Amer. J. Psychother.*, 10, 1956, 40-53.

The author presents the triangular treatment in child therapy as superior to other forms of team approach. In this approach the mother and the child are seen by the same therapist. The author points out the advantages of this technique, outlining, especially, the avenues and modes of transmission of maternal traumata. The therapist is able to view the mother-child relationship in its totality and is in a better position to manipulate the environment of either patient. The author labels this method *complementary psychotherapy*.

(*J. G. Sheehan*)

Recording

LADEFOGED, P. Recording and listening techniques. *Speech*, 20, 1956, 23-29.

The requirements for a good recording (adequate equipment, proper microphone placement, reduced noise level) and special ways of playing tape recordings (repeating, reversing, speech stretching) are discussed.

(*A. J. Berlin*)

Schizophrenic Speech

LAFFAL, J., LENKOSKI, L. D., and AMEEN, L. 'Opposite speech' in a schizophrenic patient. *J. abnorm. soc. Psychol.*, 52, 1956, 409-413.

A language syndrome is reported which the authors call 'opposite speech.' The syndrome consists basically in the use of 'yes' when the patient means 'no,' and vice versa. This lack of discrimination shows itself in both expressive and receptive distortion. Like schizophrenic negativism, the patient's speech syndrome is a means of coping with hostile impulses and serves to effectively reject communication with others. A case history and two interviews are included in the article.

(*J. G. Sheehan*)

Speech After Laryngectomy

ROBE, E. Y., MOORE, P., ANDREWS, A. H., and HOLINGER, P. H. Speech after laryngectomy. Part one: Type of operation. *Laryngoscope*, 66, 1956, 173-186.

This is the first in a series of three articles. Data concerning the type of laryngectomy,

post-operative recovery factors, and the amount and kind of pre-operative and post-operative speech training, were obtained from the case histories and operative reports of 32 persons who were laryngectomized within the preceding five year period. 'Results of the analysis indicated that the types of surgery represented in this study did not in themselves appear to determine the relative excellence of the speech result nor the amount of speech training necessary to achieve satisfactory post-laryngectomy speech.' A 14-item bibliography is presented.

(*J. M. Palmer*)

ROBE, E. Y., MOORE, P., ANDREWS, A. H., and HOLINGER, P. H. Speech after laryngectomy. Part two: Site of pseudoglottis. *Laryngoscope*. 66, 1956, 382-401.

In this article, the second of a series of three, motion picture and X-ray data are presented in an investigation of the site of the pseudoglottis in laryngectomized patients. It was found that phonation was accompanied by a circular sphincter-like drawing together of the walls of the pharynx, followed by a drawing apart of the pharyngeal walls at the level of the cricopharyngeous muscle. X-ray photos showed a constriction of the pharyngo-esophageal air column at about the 5th vertebra and cricopharyngeous muscle, with a considerable air column below the level of the constricted area in the case of good speakers. A 22-item bibliography is presented.

(*J. M. Palmer*)

Speech Band Width Reduction

BOGERT, B. P. The vobanc—a two-to-one speech band-width reduction system. *J. acoust. Soc. Amer.*, 28, 1956, 399-404.

'The Vobanc (VOice BANd Compressor) is a speech band-width reduction system which provides a reduction of two in transmission channel band width, without a comparable loss in articulation. A description is given of an experimental system and results obtained with it are described.'

(*Author's precis*)

Stapes Mobilization

BELLUCCI, R. J. Present status of the operation for mobilization of stapes. *Laryngoscope*, 66, 1956, 269-292.

GOODHILL, V. Present status of stapedolysis (stapes mobilization). *Laryngoscope*, 66, 1956, 333-381.

ROSEN, S. Mobilization at the footplate of the fixed stapedial footplate. *Acta Oto-laryng.*, 45, 1955, 532-543.

ROSEN, S. Results of mobilization of fixed stapedial footplate in otosclerotic deafness. *J. Amer. med. Ass.* 161, 1956, 595-599.

The author describes his technique for stapes mobilization. Surgical procedures and results are given. The operation is described as short and without shock to the patient. 'Hearing improvement and, in some cases, normal hearing have been maintained for periods up to 48 months at the time of writing.'

(*W. L. Thurman*)

Stuttering

CLARK, R. M. and SNYDER, M. Group therapy for parents or pre-adolescent stutterers. *Group Psychother.*, 8, 1955, 226-232.

The authors discuss the need to bring the male parent more actively into the treatment of young stutterers through the medium of group therapy sessions. They conclude that the group's major advantage over the individual approach lies in the greater opportunity for insight brought about by discussing the problems of others in the group situation. A transcript of a representative group therapy session is included.

(J. G. Sheehan)

SHEEHAN, J. G. and ZELEN, S. L. Level of aspiration in stutterers and non-stutterers. *J. abnorm. (soc.) Psychol.*, 51, 1955, 83-86.

Forty adult stutterers were compared with sixty normal speakers on three dimensions of their performance on the Rotter Level of Aspiration Board. The stutterers were significantly lower in average D score, or discrepancy between aim and accomplishment. They ranged more widely in their aspirations, and stayed more within the success area of goal setting. The authors view these differences as stemming from a common source: to a greater extent than the normal population, stutterers avoid even the threat

of failure. The strikingly low aspiration scores of female stutterers were thought to have special significance, since stuttering among females is a comparative rarity.

(*J. G. Sheehan*)

Team Approach

HENNER, R., POLLOCK, R., CAMPANELLI, P., PHILLIPS, D., and JUDIESCH, M. The team approach to hearing and speech disorders. *J. Am. med. Ass.* 161, 1956, 957-960.

The authors discuss individual responsibilities and teamwork among otologist, clinical audiologist, speech pathologist, medical social worker and clinical psychiatrist in speech and hearing cases at the Michael Reese Hospital.

(*W. L. Thurman*)

Therapeutic Groups

FRANK, J. D. Some values of conflict in therapeutic groups. *Group Psychother.*, 8, 1955, 142-151.

The author believes that conflict between members of therapeutic groups can contribute to the development of self-confidence and communication skills. For a conflict to eventuate usefully, it is essential that everyone is taken seriously, that the group is cohesive, and that communication among members is maintained, no matter how angry they become at each other.

(*J. G. Sheehan*)

Transfer of Training

BATTIG, W. Transfer from verbal pretraining to motor performances as a function of motor task complexity. *J. exp. Psychol.*, 51, 1956, 371-378.

This study represents a step in trying to identify variables in the effect of verbal pretraining on subsequent performance on a motor task. The author is concerned especially with determining the effect of complexity of the motor task on the nature and amount of transfer from verbal pretraining. It is concluded from the data that the amount of positive transfer decreases consistently as the motor task complexity increases. Possible explanations of the results are presented and discussed.

(*J. G. Sheehan*)

Vocal Cord Myography

PORTMANN, G. and ROBIN, J.-L. Myographies des cordes vocales chez l'homme. (Myography of the vocal cords in man.) *Rev. Laryng., Paris*, 77, 1956, 1-10.

Electromyographic recording from the vocal cords of patients during the course of laryngeal surgery or reconstruction shows that the action potential of a motor unit of the thyroarytenoid muscle is very brief, sometimes as short as one millisecond. During phonation the frequency of the action potential is equal to that of the emitted sound.

(*R. Goldstein, C.I.D.*)

Vocal Rehabilitation

BRODNITZ, F. S. Post-operative vocal rehabilitation in benign lesions of the vocal cords. *Folia phoniatr., Basel*, 7, 1955, 193-200.

'Vocal rehabilitation is an important part of the post-operative care of the patient with benign lesions of the vocal cords. From time of the first examination on, during the operation and in the period of convalescence the patient is in need of guidance and encouragement. The post-operative vocal care includes both the functional vocal training and the attention to the professional and personal problems of the patient. The results of the vocal rehabilitation of 32 cases are reported.'

(*Author's precis*)

Voice Analysis

RZHEVKIN, S. N. Nekotorye rezul'taty analiza pevchevskogo golosa (Some results of an analysis of the singing voice). *Akusticheskii* ZHURNAL (*Acoustics Journal USSR*), 2, 1956, 205-210.

In the voice of a highly qualified singer one notices the presence of two sharply defined 'singer's formants' in the regions of about 500 cps and 2500 cps. They are the same for all vowels and occur over the entire voice range from the lowest to the highest notes. Comparison with the voice of an inexperienced singer shows that in this latter case the singer's formants are not clearly defined and stable; the upper formant which conditions the metallic quality of the voice is lacking. An hypothesis is advanced concerning the rapid transition in the voice of the experienced singer from

the speech position at the beginning of a vowel sound to the 'singer's position' characteristic of the steady part of the sound. (Translation of author's summary.)

(M. Halle, M.I.T.)

Word-Blindness

HERMANN, K. Congenital word-blindness. *Acta Psychiat. Neur. Scand.*, suppl. 108, 1956, 177-184.

The author discusses reading and writing impairments which occur with individuals of average intelligence and with no known brain pathology. The author regards this disability as congenital word-blindness. In a series of comparative investigations of the symptoms of congenital word-blindness and Gerstmann's syndrome, he concludes that the fundamental disturbance is the same. Congenital word-blindness is regarded not as an isolated dyslexia and dysgraphia, but as one side of a more general disturbance in the symbol functions. The author presents evidence to support the hypothesis that congenital word-blindness is transmitted by dominant genes.

(B. S. Street)

News And Announcements

Significant Trends in the Professions

Norman Cousins, Editor of The Saturday Review, in a statement for the Press in honor of American Education Week, November 11 to 17 described the school as the main source of strength in a free society. 'Its job is the highest possible development of the individual in terms of his skills, his appreciation of the art of living, his ability to take part in the vital decisions being made by his community and by the nation itself. In short the school is the key connecting link between the natural capacity of Americans and their actual and potential achievements.

'Recently, the American people have been made aware of the surprising technological progress of the Soviet Union. Considerable attention has been given to the fact that the U.S.S.R. is fast developing the scientific and industrial strength that may give her a strong advantage in the present competition for world leadership. According to the reports, from three to four times as many scientists and advanced students are being graduated from universities in the U.S.S.R. as in the U.S.

'Reports such as these make it clear that the security and well-being of the American people depend on much more than stockpiles of weapons alone. The size of a stockpile by itself is no guarantee that it may not become obsolete because of advanced research now going on in the laboratories. Thus education in a very real sense becomes America's first line of defense.

'But it would be a mistake to assume that education in science can solve all America's needs in its quest for world leadership. In addition to technological skills we need the kind of educational training that will enable us to deal effectively and responsibly with peoples throughout the world. Education is incomplete today if it is concerned solely with Western civilization. We need a sensitive understanding of the histories, the cultures, the needs, the hurts, the hopes, and the wants of the majority of the world's peoples. A big showdown is coming up in the world for the good will and the support of the preponderance of people. Our approaches to the majority, therefore, will be effective only as our knowledge and understanding of other peoples is both broad and deep.

'The case for education, however, must not rest exclusively on the contribution our schools can make to the national security. While it is essential that the educated man be able to feel at home in the human community, it is just as essential that he be able to live productively and purposefully as an individual. He must know what to do with his time; he must know himself, his limitations and his possibilities; he must know how to develop his own potential to the maximum. For no waste of our resources can possibly be as wasteful or as harmful to the nation as the undeveloped mental resources of its individual citizens. The uniqueness of human life can be realized only as an individual can bring his full potential into being. Education is not the only means to this end, but it is still the most effective means yet devised.'

News and Announcements

Dr. Ira J. Hirsh, Research Associate at Central Institute for the Deaf, St. Louis, received the Biennial Award of the Acoustical Society of America in 'recognition of outstanding contributions to the science of acoustics.' The presentation was made in June at a joint meeting of the Society and the Second International Congress on Acoustics in Cambridge, Mass. Dr. Hirsh is also Associate Professor of psychology at Washington University, St. Louis.

Dr. James F. Curtis has been named chairman of the newly created Department of

News and Announcements is edited by Mary W. Huber, Los Angeles State College, assisted by the following committee: Sue Earnest, San Diego State College; Lester L. Hale, University of Florida; Henry Moser, Ohio State University; Severina Nelson, University of Illinois; Max Nelson, Michigan State College.

Speech Pathology and Audiology at the State University of Iowa. Formerly course offerings in this area were in the Department of Speech and Dramatic Art.

Herschel W. Nisonger, director of Special and Adult Education, Ohio State University, was re-elected president of the American Hearing Society at its annual meeting in Washington, D. C., June 7-9.

Hamilton Cameron announces a recently incorporated International Research Council, a world-wide medical confraternity for the dissemination of knowledge concerning aphasias associated with hemiplegia. The aims of the council include the establishment of a clearing house on the subject, and the publication of a monthly Review-Bulletin. For further information address Dr. Hamilton Cameron, 601 West 110th St., New York 25, N. Y.

The Cleveland Hearing and Speech Center has received a private research grant of $65,000 to expand its program for the differentiation of language disorders in young children. New diagnostic and therapeutic facilities have been constructed within the Center for the purpose of this research. Established as a separate Foundation within the Center structure, this research and service program will be known as the Daniel Dauby Foundation for Children with Language Disorders. Dr. Nancy E. Wood has been appointed Coordinator of the Foundation and Dr. Earl D. Schubert is Coordinator of Research.

The first annual meeting of the Speech and Hearing Society of the Province of Quebec was held on June 6, 1955. A quarterly journal is now published and Gustave Gauthier, Editor, invites members of the American Speech and Hearing Association to send communications and articles for publication. Address 3045 St. Catherine Road, Montreal 26, Canada.

The ASHA Placement Registry Service is maintained in the office of the Secretary-Treasurer, Dr. George Kopp, for all Members seeking employment or change of employment. Two lists are prepared bimonthly: one of Members seeking employment, which is sent to potential employers, and one of employers who are registered with the Placement Service, which is sent to listed Members. A large list of job opportunities is on file and is available to Members of the Association only. Members who are seeking employment or persons and agencies who desire to secure the services of our Members are urged to register with the Placement Registry Service. There are no charges for the Placement Service.

Dr. Hayes A. Newby, Professor of Audiology at Stanford University and Associate Director of the Stanford Speech and Hearing Clinic, has announced his resignation, effective September 1, 1956, as Director of the San Francisco Hearing and Speech Center, which he was instrumental in founding in 1948. Dr. Kenneth Johnson, former Chief of the Division of Audiology and Speech Correction for the Veterans Administration in Washington, D. C., will assume the directorship of the Center. Dr. Newby will maintain his association with the Center as a consultant.

Academic Press, Inc., announces the publication of a new journal, 'Information and Control' starting in 1957. The purpose of the journal is to publish papers which make significant contributions to the theories of communication, computers, and automatic control, and also papers which present experimental evidence or theoretical results bearing on the use of ideas from such theories in any field to which the ideas are relevant. Most of the articles published will be accounts of original research, but specialists will from time to time be asked to present reviews of the current state of knowledge in a field to which they have contributed. Subscribers or authors desiring further information write to Dr. Peter Elias, Research Laboratory of Electronics, Massachusetts Institute of Technology, Cambridge 39, Mass.

Meetings Announced

Speech Association of America, December 27-29, Conrad Hilton Hotel, Chicago.

American Speech and Hearing Association, November 20-22, 1957, Netherlands Plaza Hotel, Cincinnati.

Sixth International Congress of Otolaryngology, May 5-10, 1957, Washington, D. C.

Seventh World Congress of the International Society for the Welfare of Cripples, July 22-27, 1957, London, England.

American Association for Cleft Palate Rehabilitation, May 2-4, 1957, Hotel Cleveland, Cleveland.

New Materials

Number three of a series of foreign language studies translated and distributed by the Beltone Institute for Hearing Research is available. 'Experimental Study (Functional and Histological) of the Effect of Ultrasonics on Hearing' by G. Portmann, M. Portmann and L. J. Barbe, Acta Otolaryngologica (Stockholm). The study may be secured by writing the Beltone Institute for Hearing Research, 2900 West 36th Street, Chicago, Illinois.

Aphasia Rehabilitation, Manual and Work Book, by Martha L. Taylor and Morton Marks, published by the Institute of Physical Medicine and Rehabilitation, New York University-Bellevue Medical Center, has been translated into French and Spanish by the International Society for the Welfare of Cripples and is now available from that organization for $2.00 per copy. Address 701 First Avenue, New York 17, N. Y.

Hamilton Cameron has devised a method of twenty single-hand signs known as a Hand Talking Chart or the Universal One Hand Manual Language. This is described as a valuable aid in helping hemiplegic aphasics communicate some of their simple needs when speech is impossible for them. Wall size charts embodying the material are now available. The Hand Talking Chart may be obtained by writing to Dr. Hamilton Cameron, 601 W. 110th Street, New York 25, N. Y.

GO-MO Products has a new brochure describing a variety of speech correction aids and a convenient record keeping system. For a free copy write to Donald Goslin, GO-MO Products, Box 143, Waterloo, Iowa.

The National Society for Crippled Children and Adults has compiled a reference book entitled 'Rehabilitation Literature, 1950-1955.' It indexes and annotates 5,214 periodical articles, pamphlets and books relating to the medical care, education, employment, welfare and psychology of handicapped children and adults. They may be ordered for $9.00 from Blakiston Division, McGraw-Hill Book Company, Inc., 338 W. 42nd Street, New York 36, N. Y.

'The Education of Handicapped and Gifted Pupils in the Secondary Schools' is a reference for all special education people interested in secondary school programs of education for exceptional children. Copies may be obtained for $1.50 from the International Council for Exceptional Children, 1201 16th Street, N.W., Washington 6, D. C.

'See it, Say it, Do it' by Gladys M. Horn and Eileen Fox Vaughan is a word sounding and coloring book which may be ordered for 25 cents from Whitman Publishing Company, Racine, Wisconsin. 25 cents.

Learning to Think Series by Thelma Guinn Thurstone, Professor of Education, University of North Carolina, may be used for reading improvement and speech and language development in the elementary grades. Included is a standardized test for ages 5-7 which helps the teacher discover areas where children need special assistance. For further information, write to Science Research Associates, 57 West Grand Avenue, Chicago, Illinois.

Your local Bell Telephone office will provide you with a free copy of 'The Telephone and How to Use It,' especially prepared for children. It has complete instructions on how to talk on the telephone, how to look up numbers, and how to have better telephone manners. This should be a useful aid in group speech improvement sessions with young children using either toy or real telephones.

'Is Your Child Left-Handed?' is a free pamphlet for teaching left-handed writing to children. Write to the Interstate Printers and Publishers, Inc., 19-27 North Jackson St., Danville, Illinois.

'Handbook for Living' is a storybook for children and adults of everyday conversational expressions used in reading, writing and speech. It may be used as a school textbook for the deaf and retarded, a public school picture dictionary for the hard of hearing, or a parent guidebook correlated with elementary readers. Labeled

pictures point out names of things in each room of the house, parts of our bodies, clothing, etc. A supplementary speech phonograph record may be used in sound discrimination practice. 'Home Town, U.S.A.' is a pictureless storybook of everyday expressions for a town as a whole and family business like a dental appointment, banking, paying of bills and applying for a job. The set of the above two books includes a Basic English word list for foreigners. The list price of each paperbound book and the recording is $1.00. They may be ordered from Betty Lou Points, Box 356, Rochester, Minnesota.

Graduate Assistantships, Fellowships and Scholarships

Graduate Traineeships. Western Reserve University, $1600 and full tuition. Traineeships in the administration of rehabilitation programs for adults with communication problems. Program extends one full year permitting the individual to complete thirty-six semester hours of graduate work. This will lead to the degree of Master of Arts or can be applied as credit toward the doctorate by students having completed the M.A. prior to entering the program. Major emphasis will be in the field of speech therapy and audiology with minor areas in community and agency administration, social case work, and psychology. Traineeships include academic work and participation in the clinical program of the Cleveland Hearing and Speech Center. Students interested in applying for these traineeships must be accepted for graduate study by the University and approved for traineeship by the Office of Vocational Rehabilitation. Write to Director of Admission, Western Reserve University, 2040 Adelbert Road, Cleveland 6, Ohio.

Internships. University of Michigan Speech Improvement Camp: Shady Trails. Nine weeks starting June 17, 1957. Clinical work and graduate study at the camp at Northport, Michigan. Six semester hours of graduate credit. Camp pays University tuition and provides room, board and partial remuneration for travel and other personal expenses. Address John N. Clancy, University of Michigan Speech Clinic, 1007 East Huron Street, Ann Arbor, Michigan.

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